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Performance Differences between Exporters and Non-Exporters in Portugal

by

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Biographic Note

I was born in June 28th, 1991 in Oporto, where I was raised.

My academic career at the Faculty of Economics of University of Porto (FEP) began in 2009 with a degree in Economics (post-Bologna). After its completion, in 2012, I joined the Master in Economics in order to deepen and solidify the knowledge acquired with the degree in Economics.

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Abstract

In the current economic context in Portugal, marked by a strong crisis and contraction of domestic demand, internationalization seems to be an imperative of survival for most companies. This dissertation aims to find out if there are significant performance differences between exporters and non-exporters in Portugal and if those performance differences vary according to the various measures of performance used in the study. This is relevant since extant literature leads to contrasting findings in the aspects under analysis (productivity, and profitability, among others) and because there are no studies on this theme focused solely on the Portuguese case. Still, most of the literature agrees that exporters display superior productivity, size and age than non-exporters. More, they pay higher wages to their workers. Regarding profitability, no clear pattern has emerged yet between these two types of firm. So, with a sample of Portuguese manufacturing firms and considering the period 2008 to 2012, we perform OLS and Pooled OLS regressions for several measures: productivity, profitability, wages, size and age. The results are clear: In most of these measures, being an exporter per se has a positive impact. This means that, in our sample, exporters are more productive, pay higher wages, employ more workers and are older firms than their purely domestic counterparts. For profitability, whilst the results mostly confirm our hypothesis, they are not as consistent as those for other measures. In short, our findings are overall in line with the majority of the literature reviewed and the hypotheses postulated.

JEL Code: F14; F23.

Keywords: Exporters; Non-exporters; Performance; Portugal.

Resumo

No atual contexto económico em Portugal, marcado por uma forte crise e contração da procura interna, a internacionalização parece ser um imperativo de sobrevivência para a maioria das empresas. Esta dissertação tem como objetivo descobrir se existem diferenças significativas de desempenho entre exportadores e não exportadores em Portugal e se essas diferenças de desempenho variam de acordo com as várias medidas de desempenho (produtividade e rentabilidade, entre outras) utilizadas no estudo. Este tema é relevante uma vez que a literatura existente conduz a resultados contrastantes nos aspetos em análise e, porque não existem estudos sobre este tema com foco exclusivo sobre o caso Português. Ainda assim, a maioria da literatura concorda que os exportadores apresentam produtividade, tamanho e idade superiores aos não-exportadores. Mais, eles pagam salários mais altos aos seus trabalhadores. Relativamente à rentabilidade, ainda não surgiu um padrão claro entre estes dois tipos de empresa. Assim, com uma amostra de empresas industriais portuguesas e considerando o período de 2008 a 2012, realizamos regressões OLS e Pooled OLS para várias medidas: produtividade, rentabilidade, salários, tamanho e idade. Os resultados são claros: Na maioria destas medidas, ser exportador *per se* tem um impacto positivo. Isto significa que, na nossa amostra, os exportadores são mais produtivos, pagam maiores salários, empregam mais trabalhadores e são empresas mais antigas do que as suas homólogas puramente domésticas. Para a rentabilidade, enquanto os resultados maioritariamente confirmam a nossa hipótese, não são tão consistentes como os das outras medidas. Em suma, em geral, os nossos resultados estão em linha com a maioria da literatura e com as hipóteses levantadas.

Código JEL: F14; F23.

Palavras-Chave: Exportadores; Não-Exportadores; Desempenho; Portugal.

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Introduction

The recent economic context in Portugal, marked by a serious economic and financial crisis, led to a slowdown in domestic demand, causing many companies to go bankrupt and propelling the survivors to internationalize. Exports have been the main entry mode; yet over 90% of Portuguese companies never exported (INE, 2011). Exports are critical for a country like Portugal, with a sluggish domestic market, and without many other sources of growth in the near future.

This dissertation's theme is relevant for two reasons. First, although a vast literature exists exploring performance differences between exporters and non-exporters, important controversies remain. These studies, made in several countries, don't reach a consensus on whether there are or not benefits for exporting companies regarding some variables. It is also worth noting that even when these differences exist, not all studies report the same benefits, i.e., the benefits from exporting can vary greatly depending on the country of location of the company and even on the industrial sector, as argued by Greenaway and Kneller (2007) and Stöllinger *et al.* (2012). A second reason has to do with the fact that there is no study solely about the case of Portuguese companies. As a result, this dissertation is intended to fill a gap in the currently available empirical literature.

The research questions that this dissertation aims to answer are:

i. Are there significant performance differences between exporters and non-exporters in Portugal?
ii. Do those performance differences vary according to the various measures of performance used in the study (such as productivity, profitability and wages)?

Based on the above research questions this dissertation has the following objectives:

(1) to present the theory about the differences in performance between exporters and non-exporters, and whether the former have an advantage over the latter;
(2) to review extant literature on this theme;
(3) to develop hypotheses based on the theory and on the literature review;
(4) to conduct a descriptive and informative analysis of the different characteristics and performance of exporters vs. non-exporters;

(5) regarding methodology, it intends to test empirically, using econometric modelling, whether such performance differences exist with a dataset of Portugal exporting and non-exporting firms taken from the SABI database;

(6) to extract the appropriate policy conclusions arising from our empirical study.

The remainder of this dissertation will be organized as follows: in chapter 1, we perform a literature review of several studies regarding the differences separating exporters and non-exporters, organizing this literature according to different themes that will be related to the dependent variables explored in the empirical part. In that chapter, we also present the various hypotheses to be tested. Chapter 2 refers to the empirical part of this work. It presents the data and its descriptive statistics, as well as the methodologies and variables used in this study to test the afore-mentioned hypotheses. In the last section of this chapter, the results of the regressions are presented. Finally, the last part of this dissertation is dedicated to the conclusions of the study and some policy implications drawn from the results.

Chapter 1: Literature Review – Differences between Exporters and Non-Exporters

In 1995, Bernard and Jensen released the pioneering paper about the theme of differences between exporters and non-exporters (as Van Biesebroeck, 2005; Damijan and Kostevc, 2006; Greenaway and Kneller, 2007; Schank *et al.*, 2007; Wagner, 2007; ISGEP, 2008; Silva *et al.*, 2010a and 2010b; Yang and Mallick, 2010; Haidar, 2012; Schröder and Sørensen, 2012; Wagner, 2012 and Vu *et al.*, 2014 state), leading the way on this issue, and becoming a pillar for other studies. Since then, numerous studies appeared, exploring different issues related to this theme for various countries across the world, like China (Yang and Mallick, 2010; Fu and Wu, 2013; Luong, 2013), Germany (Wagner, 1995; Bernard and Wagner, 1997; Wagner, 2002; Schank *et al.*, 2007; Fryges and Wagner, 2010), Italy (Nassimbeni, 2001; Castellani, 2002; Grazzi, 2012), Slovenia (Damijan and Kostevc, 2006; De Loecker, 2007; De Loecker, 2013), Spain (Delgado *et al.*, 2002; Fariñas and Martín-Marcos, 2007; Máñez-Castillejo *et al.*, 2010; García *et al.*, 2012; Monreal-Pérez *et al.*, 2012) and USA (Bernard and Jensen, 1995, 1997, 1999, 2004a, 2004b). Thus, the literature that focuses on this topic is quite diverse but, in some respects, leads to contrasting findings. Authors like Stöllinger *et al.* (2012), Golikova *et al.* (2012), Yang and Mallick (2010) and Greenaway and Kneller (2007) report the existence of benefits of exporting, that put exporters in a better position compared to non-exporters. Nevertheless, there are authors like Bernard and Jensen (1999: 3) that prove that "shipments, productivity, and wages grow more slowly at exporters", so that the only benefit that can accrue from exporting is the company's increased probability of survival (10% higher for exporters), due to the greater stability and growth of employment. Bernard and Wagner (1997) find a similar result for Germany: compared to non-exporters, exporters are more likely to survive (with a 3 to 15% lower probability of failure over various horizons). Yet, Blalock and Gertler (2004) prove otherwise for Indonesia: the survival rate of exporters and non-exporters are similar.

There are several key concepts related to the theme of this dissertation that are worth being clarified. First and foremost, it is essential to define what are an exporter and a non-exporter. According to most authors, such as Isgut (2001), Tsou *et al. (*2008),

Fryges and Wagner (2010) and Stöllinger *et al.* (2012), an exporter is any company that exported a positive amount of its sales in a determined year, i.e., it is any firm that sold any quantity higher than zero to a country overseas. By the same logic, a non-exporter is any company that sells entirely for the domestic market. Thus, as Stöllinger *et al. (*2012: 380) point out "this implies that individual firms can switch from being a non-exporter to being an exporter in the next year and vice versa". Additionally, Wagner (1995: 30) defines exports as "all sales in a foreign country directly exported by a firm only, including sales via export agents". Given that in this dissertation the services sector is also considered in the literature review, is worth clarifying that: "In the business services statistics, exports are defined as the amount of turnover with costumers abroad, including both exports of services and goods" (Vogel, 2011: 1019). Another crucial key concept for this work is the export performance that according to OECD (2012: 11) "is measured as actual growth in exports relative to the growth of the country's export market". On the other hand, the WTO defines export performance in its website's glossary as the "requirement that a certain quantity of production must be exported". Lastly, productivity is defined by OECD (2001: 11) "as a ratio of a volume measure of output to a volume measure of input use", although admitting that there is a wide range of definitions.

The ultimate goal of this dissertation is to ascertain if in Portugal, companies selling abroad can be distinguished from their exclusively domestic counterparts considering a variety of measures and characteristics. The most consensual idea is that: The companies that start selling in foreign markets are those better prepared or are endowed with the most exceptional performance characteristics (Bernard and Wagner, 1997: 134). Taking this into consideration, in this dissertation, the main hypothesis is that exporters surpass purely domestic companies considering both the performance measures and the companies' characteristics presented in this study.

The differences between exporters and non-exporters are reflected not only in various performance measures, like productivity, wages and profitability, but also in some characteristics of the firms, like size.

1.1. Productivity

The most common difference between exporting and non-exporting companies mentioned in the literature relates to productivity, because not only it's a measure of performance itself, but also because it can influence other performance measures like profitability and wages. In this regard, it is equally important to notice that productivity is related to several effects, e.g., export premium, learning-by-exporting and self-selection. These variants will be analyzed individually in the next sections.

1.1.1. Exporter Productivity Premium

It appears to be a stylized fact that there is an exporter productivity premium, i.e., exporters are more productive than non-exporters, as ISGEP (2008: 610) prove: "the average exporter premium in the 14 countries, after controlling for individual fixed effects, is 7 per cent". Similarly, for USA, Bernard and Jensen (1995) find that value added per workers of exporters surpasses that of non-exporters by 15.8%, after accounting for several factors (industry, size and location). Castellani (2002), Bernard *et al.* (2003), Melitz (2003), Blalock and Gertler (2004), Wilhelmsson and Kozlov (2007), Egger and Kreickemeier (2012), Golikova *et al.* (2012), Grazzi (2012) and Stöllinger *et al.* (2012) find that exporting firms are more productive than non-exporting firms. Tsou *et al.* (2008) is also included in this group: they prove with their sample's mean characteristics that Taiwanese exporters exhibit a superior TFP level than non-exporters by 10.55% (in 1991) or by 11.73% (in 1996).

Máñez-Castillejo *et al.* (2010) share this conclusion. In their study of Spanish firms, the authors, distinguishing firms according to their size, also verify that larger firms are always more productive than small ones (regardless of their exporting status). Máñez-Castillejo *et al.* (2010: 319) clarify: "We can rank these four groups of firms (from lowest to highest TFP) as follows: small non-exporters, small exporters, large non-exporters and large exporters". Bernard and Wagner (1997) estimate that this productivity advantage is about 19.4% (for shipments per employee) to 21.63% (for value added per employee) in Germany, Alvarez and López (2005) that it is about 19% (for TFP) in Chile and De Loecker (2007) that it is approximately 29.59% for value added per worker and 58.63% for sales per employee, in Slovenia. Similarly, Bernard and Jensen (1999) reveal that, in USA between 1984 and 1992, exporter's productivity

surpasses non-exporters' by 16.1-23.8% in terms of labour productivity or by 12.2 to 18.0% in TFP. Van Biesebroeck (2005), in his study for nine African countries, measured this difference as well and concluded that the productivity level of firms that export exceeds that of their exclusively domestic counterparts by 57.1% (OLS estimation) or by 28.4% (Production function estimation). In this regard, Clerides *et al.* (1998) also find that firms selling abroad are more productive than those serving only their home market. The authors confirmed this result for three countries using two different measures: labour productivity and average variable costs. Exporters in Colombia, Mexico and Morocco have a higher level of labour productivity and, likewise, enjoy lower average variable costs than their domestic counterparts (the only exception is for the average variable cost in Morocco, where there are no clear distinction between the two types of firm). Hence, "exporting firms are more efficient than nonexporting firms" (Clerides *et al.*, 1998: 941). In the same vein, using similar measures, Greenaway and Yu (2004) find a productivity advantage in favour of firms selling abroad in UK. Greenaway and Yu (2004) confirm this both for the sample's average values and through estimation: Exporters in the chemical industry have a 10.4% higher labour productivity, a 9.1% greater TFP and a 2% lower average variable cost than non-exporters. Even not being their focus, these authors also verify the same pattern in other manufactures. For Spanish manufacturing companies, Fariñas and Martín-Marcos (2007) prove, with descriptive statistics, that exporters are more productive than firms serving only their home country, both in terms of labour productivity (by 38.5%) and total factor productivity (by 11%). The same result is achieved when estimating the productivity effect with a range of firm's characteristics as controls: companies selling overseas have an advantage of approximately 17% for labour productivity (value added per hour) and 7% for TFP. Recurring to stochastic dominance methods, Delgado *et al.* (2002) prove the existence of an exporter productivity premium in Spain, given that exporters' productivity exceeds that of non-exporting firms, specifically "the median productivity of the former is 7% higher than the productivity of the latter" (Delgado *et al.*, 2002: 409). For Ireland, Ruane and Sutherland (2005), use another variable to evaluate productivity: the value of turnover per worker. Still with a different measure, the conclusion remains: exporting firms are more productive than their solely domestic counterparts, even when estimating with

random effects panel data and controlling for size, time, sector and firm-specific effects (exporters are 10.5% more productive). Separating exporters into two distinct groups, Alvarez (2007) also confirms this pattern for Chile. The author reveals that sporadic exporters are 33% more productive than purely domestic firms. More, permanent exporters surpass the sporadic ones by 28% in terms of labour productivity.

On this subject, ISGEP (2008) refers that the productivity is greater the higher the ratio of exports to total sales. It also adds that "on average productivity premia are larger for countries with lower export participation rates, with more restrictive trade policies, lower per capita GDP, less effective government and worse regulatory quality, and for countries exporting to relatively more distant markets" (ISGEP, 2008: 631). Bernard and Jensen (2004b) add that the probability of exporting increases with productivity, contrarily to the finding of Castellani (2002), who states that neither the productivity level nor its growth influence the companies' likelihood of exporting.

Providing another perspective on this issue, Helpman *et al.* (2004: 314) find that the companies' productivity level influences their status in the market: "firms sort according to productivity into different organizational forms". According to this, the authors distinguish between two levels of productivity. In the low productivity level, the least productive companies exit from the market (otherwise they would face a negative profit) and the others remain producing only for the domestic market. In the high productivity level, there are firms that not only serve their own country but also sell overseas. Within this group, the most productive companies internationalize through FDI and the other high productivity firms through exportation. Hence, Helpman *et al.* (2004) show that exporters are not the most productive firms in the market, but they are always more productive than non-exporters. So, they provide evidence in favour of the exporter productivity premium. Moreover, Girma *et al.* (2005) achieve the same result in their study with UK firms comparing the productivity level of the same three kinds of firms: multinationals (both domestic and foreign), exporters and non-exporters. Damijan and Kostevc (2006) borne out these findings for Slovenia: considering the sample's descriptive statistics, it is clear that exporters display a higher value added per worker than solely domestic companies: Furthermore, exporting companies which are also engaging in outward FDI surpass domestic exporters and non-exporters.

Still within the group of authors that provide evidence in favour of this effect, Aw and Hwang (1995) confirm that exporters are more productive than non-exporters given their larger output-labour ratio, but they fail to identify what is the direction of causality, i.e., if higher productivity is the cause or the effect of exporting. To justify this fact, Aw and Hwang (1995: 328) refer that "the higher productivity among exporters appears to be related to more efficient use of inputs", but they also add that "for 59% of all the firms that engage in the export market (…) exogenous technological factors appear to play a critical role in their higher productivity" (Aw and Hwang, 1995: 330). Furthermore, in their study with Taiwanese firms, the authors attempt to explain the contribution of this productivity differences for differences in firm's output considering four electronic products. They show that the existing value-added differences between firms that export and those that only serve the domestic market are an effect of differences in productivity, but they are "product specific". Regarding the considered electronic product this discrepancy ranges from 7 to 20% (or from 3 to 10% if estimated with constant returns to scale). For China, Yang and Mallick (2010) prove with descriptive statistics that exporters display higher levels of productivity measured by TFP and sales per employee than purely domestic companies. Then, the authors confirm the results with matching techniques: exporters have an advantage of 24.3% in TFP and of 20.6% in sales per employee. Focusing on the case of the Indian firms, Haidar (2012) finds likewise evidence proving that the exporters' productivity level exceeds that of non-exporters. Firstly, when the author analyzed his sample's mean values he observed that, regarding their total factor productivity, there are no considerable discrepancies between these two types of company. However, when estimating the export premium for productivity with an OLS approach, Haidar (2012: 1769) concludes: "exporters are on average 14.8% more productive than non-exporters during 1991–1997 and 9.3% more productive than non-exporters during 1998–2004".

To provide a better understanding regarding the productivity level of exporters and non-exporters, Bernard and Jensen (2004a) studied the productivity paths of these groups of firms in the USA during a period of five years. The first pattern verified is that continuous exporters are more productive than any other group (new exporters, exiting exporters and non-exporters) at any given moment of time, e.g. the productivity advantage of continuous exporters over purely domestic firms ranges from 8 to 9%.

However, their productivity trajectory remains steady over time, meaning that exporting does not seem to influence their productivity level. It is worth noticing that the same happens with non-exporters, although at a much lower level. On the other hand, for new entrants, Bernard and Jensen (2004a) observe that two years before entry their productivity level is somewhere between the productivity level of continuous exporters (the higher threshold) and that of non-exporters (the lower threshold), but after starting to export their productivity converges (i.e., rises) to that of continuing exporters.

All above mentioned studies were conducted for the manufacturing sector. Yet, a productivity premium for exporting firms is also found in the services sector by Vogel (2011) for Germany, regarding value added per worker and turnover per employee. This result holds for the sample's mean values and for the pooled regression estimation (exporters have a higher labour productivity ranging from 12 and 20% in West Germany and from 5 to 18% in the East), but considering the fixed effects estimation, the differences between the two types of firms are not statistically significant.

On the contrary, Greenaway *et al.* (2005) show that, in contrast to the evidence in most countries, in Sweden there are no differences with regard to productivity between exporters and non-exporters, neither before nor after they start exporting. Using the sample's descriptive statistics, the authors observe that for the full sample, exporters display a lower TFP level (although when accounting for industry fixed effects there is a 10 percentage points advantage for exporters); then for both the matched and non-matched sample, results show that new exporters and non-exporters cannot be distinguished regarding TFP. For the authors, this is "probably driven by the extremely high openness of the Swedish economy" (Greenaway *et al*., 2005: 561), despite admitting other explanations. The same result is patent on the study of Girma *et al.* (2004) with Irish manufacturing plants. The authors investigate the relationship between domestic non-exporters, domestic exporters and domestic multinationals when it comes to sales per employee and value added per employee, which are measures for labour productivity. Girma *et al.* (2004) conclude that productivity of exporting and non-exporting firms is not significantly different, despite reporting that multinationals are more productive than these two kinds of companies. Wagner (2002) is another author that explored if export exerts any kind of influence in the firm's productivity. The

author employs three different methods to compare exporters and non-exporters one year before the former starts exporting. Firstly, the author employs a more traditional approach, i.e., the analysis of the mean values of his sample. This shows that exporters have a lower value of sales per worker than non-exporters. Contrarily, when Wagner (2002) estimates this difference through an OLS model, it is found that new exporters have a greater labour productivity by 3.89% than firms selling only in the domestic market, but it is statistically insignificant. Nonetheless, according to Wagner (2002: 290-291), the matching method is the one that provides the most reliable results as "a comparison of the average performance of export starters and non-exporters cannot reveal any causal impact of exports on plant performance due to self-selection of better plants into exporting". Comparing new exporting companies with their matched domestic counterparts, Wagner (2002) concludes that there are no significant differences between the two types of firms in terms of labour productivity.

Yet, there is unfavourable evidence against the exporter productivity premium. For instance, Fu and Wu (2013), in their study for China, find that exporters have a lower productivity than their non-exporter counterparts (around 18.3% using their descriptive statistics), measured by the output per employee, than companies selling exclusively in their home market.

Still related to this subject, it is worth referring to the encompassing study of Schröder and Sørensen (2012). These authors scan the studies of Bernard *et al.* (2003) and Melitz (2003) and prove that, despite the findings of these papers being interpreted as favourable for the exporter productivity premium, they only provide ambiguous evidence for this phenomenon. Schröder and Sørensen (2012) show that, within each model specifications, the results can conduct both to a positive or a negative exporter productivity premium. They further argue that, this is due to the fact that those studies use a theoretical measure for productivity (the marginal productivity) and when considering a quantifiable measure of productivity, such as the value added per worker, it is possible to verify that exporters can be less productive than non-exporters. Schröder and Sørensen (2012: 1329) explain: "the actual predictions of the theory for the sign and magnitude of the exporter productivity premium (…) depend on the distribution of

marginal productivity in the industry and on the size and presence of fixed costs and mark-ups", respectively in Melitz (2003) and Bernard *et al.* (2003) models. Furthermore, Schröder and Sørensen (2012) also succeed to establish a positive relationship between the exporter productivity premium and the heterogeneity degree of a sample of companies, i.e., the more heterogeneous the firms, the lower this effect.

At this stage, in order to provide a clear and organized view of the different studies and their respective findings about the exporter productivity premium, it is pertinent to introduce table 1.[1]

Table 1 – Overview of studies about the Exporter Productivity Premium

References	Country	Sample (Years)	Methodology	Effect	Results
Aw and Hwang (1995)	Taiwan	2,384 Firms (1986)	Descriptive statistics; Translog production function; Cross-section	+	Exporters are more productive than non-exporters.
Bernard and Jensen (1995)	USA	408,442-411,574 Observations (1976-1987)	Descriptive statistics; OLS		
Bernard and Wagner (1997)	Germany	7,624 Plants (1978-1992)	Panel data		
Clerides *et al.* (1998)	Colombia, Mexico, Morocco	1,184 Firms (1981-1991); 2,800 Firms (1986-1990); 882 Firms (1984-1991)	Panel data; Full information maximum likelihood; Generalized method of moments		
Bernard and Jensen (1999)	USA	50,000–60,000 Plants (1984–1992)	Regression		
Castellani (2002)	Italy	2,898 Firms (1989-1994)	Descriptive statistics; Cross-section		
Delgado *et al.* (2002)	Spain	1,766 Firms (1991-1996)	Kolmogorov-Smirnov tests; Kernel estimators		
Bernard et al. (2003)	USA	200.000 Firms (1992)	Static Ricardian model of heterogeneous plants and trade; Simulation approach		
Melitz (2003)	∅	∅	Dynamic industry and general equilibrium model; Comparative static analysis		
Bernard and Jensen (2004a)	USA	50,000-60,000 Plants (1983-1992)	Olley-Pakes (1996) production function		
Blalock and	Indonesia	20,018 Firms	Descriptive statistics		

[1] The approach adopted for the structure of all tables reported was the following: results were reported, first of all, according to the conclusions of the studies; inside each type of conclusion, studies were reported by chronological order, from the older to the most recent study.

Gertler (2004)		(1990-1996)			
Greenaway and Yu (2004)	UK	461 Firms (1989-1999)	Descriptive statistics; Panel data		
Helpman *et al.* (2004)	USA; 27-38 European countries	961 (narrow sample) - 1,175 (wide sample) Observations (1994)	Regression; General Equilibrium Model		
Alvarez and López (2005)	Chile	5,000 Plants (1990-1996)	Panel data		
Girma et al. (2005)	UK	3,799 Firms (1990-1996)	Descriptive statistics; Kolmogorov-Smirnov tests		
Ruane and Sutherland (2005)	Ireland	2,854 Firms (1991-1998)	Descriptive statistics; Random effects panel data regression		
Van Biesebroeck (2005)	9 sub-Saharan African countries	1,916 Firms (1992-1996)	Panel data; OLS; Production function estimation		
Damijan and Kostevc (2006)	Slovenia	903-1,379 Firms (1994-2002)	Descriptive statistics		
Alvarez (2007)	Chile	More than 5,000 Plants (1990-1996)	Regression		
De Loecker (2007)	Slovenia	6,391 Firms (1994-2000)	OLS		
Fariñas and Martín-Marcos (2007)	Spain	1,403 Firms (1990-1999)	Descriptive statistics; Regression; OLS; Differences and System General Method of Moments		
Wagner (2007)	34 countries	(1995-2006)	Survey of 54 microeconometric sudies		
Wilhelmsson and Kozlov (2007)	Russia	13,123-18,602 Firms (1996-2002)	Descriptive statistics; Pooled OLS; Fixed effects model		
ISGEP (2008)	14 Countries	9,909-1,310,771 Observations (1981-2005) (depending on the country)	Panel data; Pooled OLS; OLS with fixed effects		
Tsou *et al.* (2008)	Taiwan	5,923-9,639 Plants (1986-1996)	Descriptive statistics		
Egger and Kreickemeier (2010)	∅	∅	General equilibrium model		
Máñez-Castillejo *et al.* (2010)	Spain	1.175-1.716 Firms (1991-2002)	Kolmogorov-Smirnov tests; Propensity Score Matching (nearest neighbours, radius and kernel)		
Yang and Mallick (2010)	China	2,340 Firms (2000-2002)	Descriptive statistics; Propensity Score Matching		

			(kernel, radius, calliper, nearest neighbour)		
Vogel (2011)	Germany	13,845 (East)-51.780 (West) Observations (2003-2005)	Descriptive statistics; Pooled regression; Fixed effects model		
Golikova *et al.* (2012)	Russia	499 Observations (2005-2009)	Descriptive statistics; Panel data		
Grazzi (2012)	Italy	60,000 Firms (1989-2004)	Non-parametric methods: Fligner-Policello test; Pooled OLS		
Haidar (2012)	India	33,510 Firms (1991-2004)	Descriptive statistics; OLS		
Stöllinger *et al.* (2012)	Austria	6,000-6,300 Firms (2002-2006)	OLS		
Wagner (2012)	6 countries	(2010-2011)	Survey of 7 empirical studies		
Wagner (2002)	Germany	9,425 Firms (1978-1989)	Descriptive statistics; OLS; Panel data; Propensity Score Matching (nearest neighbour)	N.S.	No significant productivity differences between exporters and non-exporters.
Girma *et al.* (2004)	Republic of Ireland	Observations: 307 DN, 647 DE, 246 MN (2000)2	Descriptive statistics; Kolmogorov-Smirnov tests		
Greenaway *et al.* (2005)	Sweden	3,570 Firms (1980-1997)	Descriptive statistics		
Fu and Wu (2013)	China	879,000 Firms (2004)	Descriptive statistics	-	Exporters are less productive than non-exporters.

Source: Own elaboration.

Regarding productivity *per se* as a measure of a firm's performance, there are, as expressed in the text above, diverse results for several measures and methods employed. Still, it is very clear that the greatest majority of studies presented in this section support the idea in favour of a productivity superiority of exporters when compared to purely domestic firms. This idea is confirmed in Wagner (2007)'s survey of 54 microeconometric studies for the manufacturing sector and in Wagner (2012)'s survey of empirical studies for the services sector. Hence, this dissertation will test the following hypothesis:

H.1.1. Exporters are more productive than non-exporters.

[2] DN = Domestic Non-exporters, DE = Domestic Exporters, MN = Domestic Multinationals.

Explanations for the Exporter Productivity Premium

Given that the productivity premium of firms engaged in international trade appears to be a stylized fact, there are two possible and plausible explanations that emerge in order to provide a better understanding of the source of this advantage over non-exporting companies. Regarding this matter, Bernard and Jensen (1999) initiated the wide series of studies that attempt to explain this difference separating companies supplying foreign markets and those serving only their home country (Greenaway and Yu, 2004; Silva *et al.*, 2010b; Golikova *et al.*, 2012). The first explanation is the learning-by-exporting effect, which basically constitutes the hypothesis that exporting generates productivity improvements, i.e., exporters' higher productivity is the result of the exporting activity. The alternative justification predicts that the more efficient and productive firms in the market self-select to start selling abroad, so in this case greater productivity determines the beginning of the exporting activity. Therefore, the greater productivity can be an *ex-ante* and/or an *ex-post* effect of exporting, meaning that: "exporters may be exceptional because good firms become exporters, or because exporting is good for firms, or both" (Bernard and Jensen, 1999: 2).

At this stage, it is pertinent to clarify that the last two above mentioned effects are not mutually exclusive, as Bernard and Wagner (1997), Clerides *et al.* (1998), Bernard and Jensen (1999, 2004a), Castellani (2002), Delgado *et al.* (2002), Wagner (2002), Greenaway and Yu (2004), Fariñas and Martín-Marcos (2007), Wagner (2007), ISGEP (2008), Tsou *et al.* (2008), Silva *et al.* (2010a, 2010b), Haidar (2012) and De Loecker (2013) point out. Monreal-Pérez *et al.* (2012: 864) state that it is possible that "the markets select the more productive firms at the same time as exposure to international markets makes these productive firms become even more productive".

1.1.2. Learning-by-Exporting

In some countries, the existence of a learning-by-exporting effect is also confirmed being described by Yang and Mallick (2010) as a productivity gain (i.e., a productivity growth) in the exporting companies after they start their exporting activity. Yang and Mallick (2010) estimate that two years after entry, TFP of Chinese export entrants grows 34% more than that of non-internationalized firms, and the same happens for

sales per employee (29.1%). Additionally, Yang and Mallick (2010: 1220) claim that the "learning-by-exporting fosters higher firm-level productivity, and transfers knowledge from international buyers and competitors to help improve the post-entry performance of exporters". Similarly, Fariñas and Martín-Marcos (2007: 619) explain: "the learning-by-exporting hypothesis (...) considers that once firms are in the export market, they can take advantage of economies of scale or acquire knowledge from a greater exposure to better practices that foster learning". Other possible explanations for this "export-led growth" presented by Bernard and Wagner (1997: 147) are greater pressure applied on internationalized firms by their international competitors and consumers (firms have to meet higher product standards). This issue does not reunite consensus among the authors, because there is a large range of studies proving that this effect exists and a series of others that refute this idea.

In the spectrum of authors that are in favour of this effect, we may refer García *et al.* (2012: 1109): in their study of Spanish companies, they warn that "although firms may gain access to knowledge from several agents (e.g., competitors, customers, intermediaries) in foreign markets, (…) firms need a critical mass of previous technological knowledge and expertise to recognize the value of external knowledge, integrate it into their current operations and fully realize its potential benefits". In other words, they refer that this productivity increase derived from the exporting activity depends on the firm's R&D level: the higher the R&D investment, he greater the post-entry productivity benefit. Greenaway and Kneller (2007) report that exporters experience a 2.9% improvement on their TFP growth rate during all three post-entry years. Still, these authors also warn that this ex-post productivity boost gets diminished if the exporting company belongs to an industry with high levels of R&D, of intra-trade commerce or high FDI exposure. Hence, the productivity growth effect is variable with the kind of industry. Additionally, De Loecker (2007), who confirms the learning-by-exporting effect in Slovenia (variable with the sector), stresses that this productivity gain due to entrance in export markets is not a one-time effect, neither in terms of its level nor concerning its growth. Regarding the productivity level, the author verifies that after entry the difference is by 8.8% in the first year, increasing until 13% four years later. When it comes to productivity growth, De Loecker (2007) proves that it also deepens since the moment that firms start selling abroad (7.9% of growth) and it hits a

12.4% favourable difference in the fourth year after that. The author warns that it was expected since the country went through a transition from communism to a market economy.

Máñez-Castillejo *et al.* (2010) study as well the learning hypothesis and find, distinguishing their sample of Spanish firms both by size and by exporting status and applying three matching methods, that there is evidence in favour of this effect. Following the entrance in the export market, the productivity growth of small firms remains steady during a year. At that moment, the productivity growth becomes significant and hits the peak (varying from 7.2% to 8.6%, according to the method considered). From that moment on, the productivity growth of small exporting companies starts falling down (to approximately, 6% four years after the entry in foreign markets). For large firms Máñez-Castillejo *et al.* (2010) observe a different and quite opposite reality. It seems that it takes longer for big export companies to initiate the productivity growth (it only starts after two years selling in foreign markets: nearly 14% in all methods), but contrarily to small firms, once the productivity starts growing it does not exhibit a decreasing phase. For large firms, the productivity growth gets stronger over time (i.e., after four years, the difference is between 15.1% and 15.9%). For the authors, a possible justification beneath these distinct findings for small and large exporters is the fact that the latter tend to serve more developed and exigent markets. These results are somewhat striking, because Máñez-Castillejo *et al.* (2010) revel that, regardless the size of the company, this *ex-post* productivity growth due to the export activity is not immediate (it takes time for it to start). It is also important to highlight that: "the fact that the highest EPG is attained during the first exporting years suggests higher learning intensity these years" (Máñez-Castillejo *et al.*, 2010: 331), which means that even if it there is a little delay between the entrance and the start of the learning process, the companies start absorbing all the information available in the foreign markets, once they are exposed to tougher conditions, stronger rivals and more demanding customers, that push them towards improvement.

Finally, Blalock and Gertler (2004), Van Biesebroeck (2005), Yasar and Rejesus (2005) and Silva *et al.* (2010b) also find evidence in favour of the learning-by-exporting hypothesis, the former for Indonesia, the second for sub-Saharan African countries, the third for Turkey (and considering three different productivity measures: total factor

productivity, output and labour productivity), and the latter for Portugal. Blalock and Gertler (2004) estimate that this post-entry productivity gain in favour of exporters varies from 1.6 to 5.1% according to the four methods applied (10 estimations). Van Biesebroeck (2005) estimate that after starting to export, internationalized firms show higher productivity than non-exporters (of approximately 68.3% in the OLS estimation, or 66.4% for the production function estimation but it is not statistically significant). Still, their productivity growth rate is higher (by 16.1%) than for domestic companies. More, the author conducted an estimation of the influence of exporting on firm's productivity using four distinct methods and, for the most reliable approach (the random effects estimation); he found that the exporting induces a productivity advantage for exporters of about 26.3% (or ranging from 25 to 28.1% for the other methods).

Discussing this topic further, De Loecker (2013) points out that most of the studies misjudge the learning-by-exporting hypothesis (which can justify the lack of evidence in favour of this effect), as they do not allow exporting to affect productivity. Alternatively, these studies end up attributing the productivity effects to other causes, e.g. "if productivity gains from exporting occur simultaneously with investment, this will bias the capital coefficient upward" (De Loecker, 2013: 7). For De Loecker (2013: 1), this situation is due to the fact that "currently used econometric methods rely on the assumption that productivity evolves exogenously". Thus, to investigate this, the author states the importance of considering that having exported in the past influences the *ex-post* productivity of a firm (an idea ignored by other works). De Loecker (2013: 2) warns that "Learning by exporting refers to a variety of mechanisms that might induce productivity gains when firms start exporting, such as investing in marketing, upgrading product quality, innovating, or dealing with foreign buyers". For this reason, the author compares the estimations of the capital stock growth obtained with an exogenous and an endogenous process. He finds that the former amplifies the capital stock coefficient, damaging the evidence for learning-by-exporting. Hence, De Loecker (2013) proves the importance of considering the latter approach, more reliable, because with it there is an overall decrease on the capital coefficients (by 30%, compared to those of the exogenous approach), therefore correctly accounting for the learning phenomenon. The author also stresses, estimating with his sample of Slovenian manufacturing firms, that the *ex-post* productivity improvement is variable across sectors and it "depends on the

firm's initial productivity level" (De Loecker, 2013: 17). In short, this paper's main conclusion is that there is positive evidence for the learning-by-exporting effect in Slovenia.

On the other hand, there is a range of authors, such as Girma *et al.* (2005) for the UK, Greenaway *et al.* (2005) for Sweden, Ruane and Sutherland (2005) for Ireland and Fariñas and Martín-Marcos (2007) for Spain, finding that there are no considerable productivity gains in exporters after internationalization, therefore providing non-significant evidence for this hypothesis. Greenaway *et al.* (2005) confirm these results for a matched difference-in-difference approach for TFP (estimating for all period, for sub-periods, separating industries by their technological level and also for robustness tests) and for labour productivity. Hence, the authors add that this result is probably due to the "extremely high openness of the Swedish economy" (Greenaway *et al.*, 2005: 561). In their study for Spain, Monreal-Pérez *et al.* (2012) also agree with the idea that it is not the export activity that induces a company to become more innovative or productive. As a possible explanation, the authors point out the fact that when both the origin and the destination countries are developed, there's no room for transference of new knowledge due to exporting. Likewise, Luong (2013), in his study for the automobile sector in China, concluded that exporting companies do not enjoy any *ex-post* productivity improvements. This finding was consistent for two different methods: the Ackerberg *et al.* (2006) (*cfr.* Luong, 2013).and the Levinsohn-Petrin (2003) (*cfr.* Luong, 2013) approaches. In both methods, the non significant evidence for the learning effect arises from the fact that, in the pre-entry period, exporters had already a productivity advantage of 20% over their solely domestic counterparts and after the beginning of their exporting activity, the gain was 21%, which does not constitute a considerable difference. This finding also holds when considering new, young and established exporters. To explain these results, Luong (2013) advances three possible justifications: the destination markets (mainly developing countries), the high turnover rate in the automotive sector and the fact that the firms with a share of foreign capital (which a lot of Chinese automotive firms are) may decrease the learning possibilities due to exporting, as they are already in contact with the foreign market. Wagner (2002) belongs also to the series of authors reporting non significant results for the learning-by-

exporting hypothesis. The author compared the evolution of the growth of labour productivity between firms that do and do not export for the period comprising one year before exporters start to export and three years after they do. As a first approach, analysing the mean values of his sample of German firms, he observed that exporting companies have a faster growth than non-exporters (18.71% vs. 14.06%). The same result was obtained when estimating with an OLS model: a positive (yet not significant) difference of 5.98% for exporters. Furthermore, Wagner (2002) applied a matching method to his sample, which provided more accurate results, and corroborated that firms selling abroad have indeed a greater rate of growth of average sales per worker than matched non-exporters (18.85% vs. 14.96%), but again it is statistically insignificant. Studying the Indian case, Haidar (2012) also provides non-significant evidence for learning-by-exporting. The author verifies that there are some benefits for exporters once they start selling overseas, but the productivity growth is not one of them.

Moreover, Bernard and Wagner (1997) find even a deceleration of the productivity growth in firms that export. Their study focuses on the German case, and the authors report that, when considering time periods of one, five and ten years after entry, there is a decrease of 1.6-3.8% for value added per employee and of about 1.7-4.9% for shipments per worker. Moreover, Bernard and Wagner (1997) show that even if new export entrants present a positive growth of value added per worker (4.83%), there is no evidence that this good performance is maintained over time, since productivity growth of continuous exporters declines (-1%).

Yet, it is worth highlighting that there is a range of studies that present ambiguous evidence for the ex-post learning effect, like the pioneering study of Bernard and Jensen (1999). Studying the US case, the authors find out that, in terms of value added per employee and TFP, exporting firms perform worst than non-exporters, as their growth rates are negative, both in the short and in the medium and long run. However, when comparing the performance of four different groups (export entrants, export stoppers, non-exporters and continuing exporters), the results are different. New exporters are remarkably better than non-exporters with higher growth rates for labour productivity

and TFP, both in short and longer horizons. Also with unclear evidence for this effect are Wilhelmsson and Kozlov (2007) because they state that although exporters show a significant growth in the first years after they start exporting (and their productivity growth always surpass that of non-exporters), it does not mean that that good performance is maintained over the following years. Wilhelmsson and Kozlov (2007) observe that productivity growth rate of Russian exporting companies tends to diminish (and become negative) in the post-entry period. Then, when separating exporters by categories and estimating with a translog production function, they conclude that new, continuing and switching exporters display a higher TFP growth than merely domestic companies. Hence, the results are inconclusive.

Clerides *et al.* (1998) also provide blurred evidence for the learning hypothesis. Firstly, the authors analyzed the trajectories of their sample of Colombian, Mexican and Moroccan companies and observed distinct results for each country regarding two different measures of productivity. Concerning both average variable cost and labour productivity, in Colombia new exporters exhibit a decline in their costs and an increase in their productivity after starting to sell abroad, but in Mexico and Morocco that is not the case; contrarily their costs and their productivity level remain almost unaltered *ex-post*. Hence, the evidence in favour of the learning-by-exporting hypothesis is found only for one of the considered countries. It is important to stress that, for these authors, such findings might be related to the higher presence of qualified work in new exporters. However, in order to confirm these results, Clerides *et al.* (1998) estimated a full information maximum likelihood regression (which is a more reliable approach) for Colombia and Morocco. Once again, the findings are ambiguous, because there is evidence of a learning effect due to the exporting activity (manifested through the costs' decrease) but only for firms in the leather or apparel industries in Morocco. For the remainder sectors and for Columbia the results show two alternative scenarios: exporting does not influence the companies' *ex-post* performance or it even brings higher average variable costs for exporters.

Greenaway and Yu (2004) confirm this finding for the UK chemical industry. The authors verify that the learning effect decreases with the export experience of the firm, i.e., it is "significant and positive for new entrants, less significant for more experienced exporters and negative for established exporters", where more experience exporters

designate those firms with 2 or 3 years of export activity (Greenaway and Yu, 2004: 378). If the export-sales ratio of the firm raises 10%, the productivity (TFP) growth observed in the next period is 2.13%, 0.9%, 0.1% and -1.13%, respectively for exporters with one, two, three and more years of exporting activity (Greenaway and Yu, 2004: 389). As a possible reason for this is that "since established exporters are those firms which have successfully survived competition in export markets for many years, they may have already exhausted the benefits of learning" (Greenaway and Yu (2004: 389). Damijan and Kostevc (2006) also conclude that there are ex-post productivity improvements, but they are temporary. The authors add that this can be attributed to a deepening in capital intensity after entry, but after further investigation, Damijan and Kostevc (2006: 610) affirm: "The observed productivity improvements are hence primarily a reflection of the growth in inputs". Another explanation is provided by Tsou *et al*. (2008) who prove that it depends on the stage of the economic cycle. They verify that "while continuing exporters grow substantially slower than continuing non-exporters in the downturn period (...), continuing exporters outperform continuing non-exporters in the upturn period" (Tsou *et al.*, 2008: 202).

Likewise, Delgado *et al.* (2002) end up with ambiguous results for the learning effect, once they find that, in terms of their productivity growth, new exporters cannot be distinguished from non-exporters. Nevertheless, when controlling for the firms' heterogeneity and excluding older companies from the sample, Delgado *et al.* (2002) prove that there are *ex-post* improvements in the productivity growth for the group of firms selling overseas that constitutes an advantage over companies serving only the domestic market. Bernard and Jensen (2004a), in their study for US manufacturing companies also provide inconclusive evidence for the learning hypothesis. These authors prove that albeit export starters have a more intense productivity growth than non-exporters of approximately 1.2 to 2.5%, when focusing on continuous exporters the results are very different. Companies that continuously export have a 0.72% inferior productivity growth than firms serving only their domestic market. Thus, Bernard and Jensen (2004a) conclude that the exporting activity does not seem to be the cause boosting higher productivity growth. Yet with uncertain conclusions for the learning-by-exporting phenomenon, Castellani (2002: 621) finds, for Italy, that "exporting does not cause *per se* any productivity gain. Possibly, positive effects from exporting activity

occur only above a certain threshold of export intensity". This means that the exporters' faster productivity growth after starting to export is not a generalized effect to all firms; contrarily, it only happens to those that export the bigger slice of their total sales. In the same vein, Alvarez and López (2005) observe that Chilean new exporters have a 17% higher TFP than non-exporters in the post-entry period when accounting for initial characteristics of the firms. However, in this case, continuous exporters and purely domestic firms display similar productivity; more, the authors verify that later export starters, even being 13.4% more productive than non-internationalized companies, have a lower productivity than earlier starters (19.4%). In short, it appears that there are ex-post gains for exporters but they are momentary and happen only in a short horizon. Hence, these results present unclear evidence for the learning effects. With a large sample of 14 European countries plus Chile, China and Colombia, ISGEP (2008) confirm the learning-by-exporting thesis only for Italy, while for the rest of the countries there are mixed results.

One of the most cited reasons for the diverse evidence on the learning-by-exporting effect is the destination of exports. This possible justification is provided both by authors in favour and against the learning hypothesis. For instance, Wilhelmsson and Kozlov (2007) obtained an important result: The exports' destination country has a doubtful effect on productivity (but once their study is for Russia, it might be due to Russia's financial crisis in 1998). Although the authors find that productivity is higher in firms exporting for developed countries (e.g., OECD) rather than for other countries (like CIS[3]), they also state that "it seems to be an effect of firm-specific characteristics rather than of exporting activity *per se*" (Wilhelmsson and Kozlov, 2007: 380). With a contrary opinion, Ruane and Sutherland (2005), in their study for Ireland, state that the destination of exports matters, proving that it can influence the exporters' performance. They find that firms exporting to more distant and unknown markets have to face fiercer challenges in order to survive on that market, which push them towards continuous improvement. Hence, this effect is reflected on exporters' performance: They get bigger concerning the company's turnover and more productive, hire more qualified employees and pay higher average wages to their workforce than those companies exporting to

[3] CIS stands for Commonwealth of Independent States, an association of former Soviet republics.

more similar markets. Ruane and Sutherland (2005) considered that this is the case of Irish exporters serving non-UK markets, because UK is an easier market for Ireland given "the relatively lower transaction and transportation costs associated with exporting to the United Kingdom, combined with the historical economic, institutional, and social ties, and the trade agreements" (Ruane and Sutherland, 2005: 454). De Loecker (2007) also addressed this issue, showing the importance of the destination of exports in the productivity effect, both in terms of the type and the number of countries. Companies exporting to more developed countries or regions exhibit a larger increase in the productivity. The same happens to those firms exporting to a bigger number of countries. For De Loecker (2007), this proves not only that indeed there is a transmission of knowledge from foreign markets but also that more efficient companies are capable to support higher internationalization fixed costs. The importance of the market of destination of the exports is addressed as well by Máñez-Castillejo *et al.* (2010). They explain that it can influence the learning-by-exporting effect, because firms exporting to more developed markets face greater pressure than those selling to less developed ones. Once the authors distinguish their sample regarding the companies' size they conclude that small firms export more intensively for less developed and large firms for highly developed markets. For example, "the percentage of exporters for which the EU is the main destination market is more than 7 per cent higher for large than for small exporters (79.17 per cent and 71.67 per cent, respectively)" (Máñez-Castillejo *et al.*, 2010: 336). This issue is also considered by Luong (2013) as a possible justification for the non significant evidence for the learning-by-exporting effect, because the majority of the exports of the automotive Chinese sector head to developing markets. In this case, because both the origin and the destination countries are similar, there are no considerable learning opportunities. Overall, in his survey of empirical studies, Wagner (2012: 238) confirms that indeed the destination of the exports is a very important matter. Indeed, he verifies that: "Exporters to more developed economies have superior *ex-ante* productivity levels than non-exporters and firms exporting to less developed countries".

Given that the learning-by-exporting effect is far from being a consensual issue, it seems appropriate to introduce table 2, which summarizes the essential information regarding this matter.

Table 2 – Overview of studies about the Learning-by-Exporting Effect

References	Country	Sample (Years)	Methodology	Effect	Results
Blalock and Gertler (2004)	Indonesia	20,018 Firms (1990-1996)	Panel Translog production function; Pooled OLS; Factory fixed-effects estimation; Olley-Pakes (1996) estimation; Levinsohn-Petrin (2003) estimation	+	Exporters experience a productivity gain after they start exporting.
Alvarez and López (2005)	Chile	5,000 Plants (1990-1996)	Panel data; Probit		
Van Biesebroeck (2005)	9 sub-Saharan African countries	1,916 Firms (1992-1996)	Panel data; OLS; Production function estimation; Random effects estimation; System-Generalized Method of Moments; Maximum likelihood; Semi parametric estimation		
Yasar and Rejesus (2005)	Turkey	5,805 Observations (1990-1996)	Propensity Score Matching; Difference-in-difference estimators		
De Loecker (2007)	Slovenia	6,391 Firms (1994-2000)	Propensity Score Matching (nearest neighbour); Difference-in-differences		
Greenaway and Kneller (2007)	UK	12,875 Observations (1990-1998)	Propensity Score Matching (nearest neighbour); Difference-in-differences		
Máñez-Castillejo *et al*. (2010)	Spain	1.175-1.716 Firms (1991-2002)	Kolmogorov-Smirnov tests; Propensity Score Matching (nearest neighbour, radius and kernel)		
Silva *et al.* (2010b)	Portugal	4,500 Firms (1996-2003)	Fixed Effects model; Propensity Score Matching (nearest neighbour, kernel); Difference-in-difference; OLS		
Yang and Mallick (2010)	China	2,340 Firms (2000-2002)	Propensity Score Matching (kernel, radius, calliper, nearest neighbour); Difference-in-difference		
García *et al.* (2012)	Spain	1,534 Firms (1990-2002)	OLS with an AR autoregressive process		
De Loecker (2013)	Slovenia	7,915 Firms (1994-2000)	Nonparametric regression; Difference-in-difference		
Wagner (2002)	Germany	9,425 Firms (1978-1989)	Descriptive statistics, OLS; Panel data; Propensity Score Matching (nearest neighbour)	**N.S.**	No productivity differences between exporters
Girma *et al.*	UK	3,799 Firms	Kolmogorov-Smirnov tests		

(2005)		(1990-1996)			and non-exporters in the post-entry period.
Greenaway *et al.* (2005)	Sweden	3,570 Firms (1980-1997)	Descriptive statistics; Difference-in-differences; Propensity Score Matching (calliper)		
Ruane and Sutherland (2005)	Ireland	2,854 Firms (1991-1998)	Random effects panel data regression		
Fariñas and Martín-Marcos (2007)	Spain	1,403 Firms (1990-1999)	Propensity Score Matching (nearest neighbour)		
Haidar (2012)	India	33,510 Firms (1991-2004)	Propensity Score Matching (nearest neighbour, radius)		
Monreal-Pérez *et al.* (2012)	Spain	1,767 Firms (2001-2008)	Panel data; Random effects probit regression		
Luong (2013)	China	(1998-2007)	Regression		
Bernard and Wagner (1997)	Germany	7,624 Plants (1978-1992)	Panel data	-	There is a decrease in productivity (level or growth) after companies start exporting.
Clerides *et al.* (1998)	Colombia, Mexico, Morocco	1,184 Firms (1981-1991); 2,800 Firms (1986-1990); 882 Firms (1984-1991)	Panel data; Full information maximum likelihood; Generalized method of moments	**Ambiguous**	There is a growth effect after the firm starts exporting but only under certain circumstances or for certain firms.
Bernard and Jensen (1999)	USA	50,000–60,000 Plants (1984–1992)	Regression; Probit		
Castellani (2002)	Italy	2,898 Firms (1989-1994)	Cross-section; Huber-White Sandwich Estimator		
Delgado *et al.* (2002)	Spain	1,766 Firms (1991-1996)	Kolmogorov-Smirnov tests; Kernel estimators		
Bernard and Jensen (2004a)	USA	50,000-60,000 Plants (1983-1992)	Olley-Pakes (1996) production function		
Greenaway and Yu (2004)	UK	461 Firms (1989-1999)	Panel data; First difference; Dynamic panel instrument approach		
Damijan and Kostevc (2006)	Slovenia	903-1.379 Firms (1994-2002)	Propensity Score Matching (nearest neighbour, calliper); Difference-in-differences; System Generalized Method of Moments		
Wagner (2007)	34 countries	(1995-2006)	Survey of 54 microeconometric studies		
Wilhelmsson and Kozlov (2007)	Russia	13,123-18,602 Firms (1996-2002)	Pooled OLS; Fixed effects model; System General Method of Moments; Translog production function		

ISGEP (2008)	14 Countries	9,909-1,310,771 Observations (1981-2005) (depending on the country)	Panel data; Pooled OLS; OLS with fixed effects		
Tsou *et al.* (2008)	Taiwan	5,923-9,639 Plants (1986-1996)	OLS; Propensity Score Matching (nearest neighbour, kernel and calliper)		

Source: Own elaboration.

The learning-by-exporting effect is far from being a consensual explanation for the higher productivity of exporters, as emphasized in the survey of various studies performed by Wagner (2007: 66), where the author stresses that "exporting does not necessarily improve firms". Yet, in this section there is a wider range of works in favour of this phenomenon, than against it. For this reason, we advance the hypothesis that exporting companies exhibit an *ex-post* productivity growth, i.e., the productivity gap between exporters and their solely domestic counterparts gets broader after entry.

H.1.2. Exporters experience a productivity growth after entering in the export markets.

1.1.3. Self-Selection

Another issue, frequently mentioned on the literature, is the existence of a selection-into-exporting effect or self-selection effect, i.e., "more productive firms are the ones that tend to become exporters" (Yang and Mallick, 2010: 1219). To enter foreign markets, companies face internationalization costs (e.g., production, distribution, marketing), some of them sunk and irrecoverable, hence only the firms with the finest characteristics can start exporting and still have profit. This is the reason why the export status tends to be stable (Clerides *et al.*, 1998, Castellani, 2002, Greenaway and Yu, 2004 and Grazzi, 2012). Another explanation, proposed by Bernard and Wagner (1997: 148) might be the "forward-looking behaviour of firms"; this idea is also mentioned by Bernard and Jensen (1999) and ISGEP (2008).

Clerides *et al.* (1998) prove that even several years before selling overseas, future exporters in Colombia and Mexico already exhibited lower average variable costs than non-exporters, but in Morocco it is quite the contrary. Concerning labour productivity,

Colombian and Moroccan entrants are more productive than their domestic counterparts (only in Mexico there is no distinction between the two types of firms). Given that for all the three countries, companies appear to be productive in at least one of the considered measures, the evidence is positive for the self-selection hypothesis. For the USA, Bernard and Jensen (1999) find clear supporting evidence for the selection-into-exporting: exporters display greater levels of value added per worker (7.16-8.66%) than domestic-oriented companies since three years before start selling abroad (though, TFP levels are not significant). In terms of growth rates, the productivity estimates are not statistically significant. In his study for Italy, Castellani (2002) shows that three years prior to entry in the export market, exporters are already more productive than their domestic counterparts, but regarding their productivity growth there are no significant differences separating the two types of firms. Still, it is favourable evidence for the self-selection effect. Likewise, Bernard and Jensen (2004a) prove, with a sample of US manufacturing firms, that two years before entry, future exporters are already much more productive than firms serving only their home market. With this result the authors conclude that the higher productivity of exporters is due to the self-selection and not to the learning effect. Another study confirming this result is the one of Greenaway and Yu (2004), in which they verify that a company becomes more likely to initiate the export activity after it gets more productive. In other words, if the firm's productivity grows 10% in terms of its TFP, then its probability of entering in foreign markets is 5.29%. Similarly, Ruane and Sutherland (2005) prove that before exporting, Irish exporters are already, not only more productive, but also larger and more profitable and pay higher wages than domestic-oriented companies.

In a study for 9 sub-Saharan African countries, Van Biesebroeck (2005) shows that before entry, exporters experience a decrease in their productivity growth rate (approximately -9% in both OLS and Production function estimations). Still, this seems not to hurt future exporters since they are already 55.2% (Production function estimation) to 61.1% (OLS regression) more productive than their domestic counterparts. Hence, the author finds favourable results for the selection-into-exporting phenomenon. Wilhelmsson and Kozlov (2007) also lend support to this theory in Russia: they prove that, whilst three years before initiating their exporting activity, the TFP level of future exporters is similar to that of non-exporters, in the year preceding

entry, they are already more productive than purely domestic firms. For China, Yang and Mallick (2010) observe an ex-ante productivity growth advantage for exporters ranging from 32.3 (TFP) to 33.3% (sales per employee) in the year previous to exporting. In the same vein, Luong (2013) finds that only the most productive firms start serving the foreign market, because *ex-ante* these companies already have a productivity benefit over non-exporters of approximately 22% (for export starters).

Moreover, measuring this effect, Alvarez and López (2005: 1392) declare that "a 1% increase in productivity increases the probability of beginning to export to almost 1%". Bernard and Wagner (1997) add that even 3 years before exporting, exporters already had better performance, being approximately 5% more productive than companies which didn't export. Hereupon, Bernard and Wagner (1997: 157) conclude that "success leads to exporting rather than the reverse". Another authors also find evidence in favour of this effect, e.g., Bernard *et al.* (2003) for U.S. firms, ISGEP (2008) for firms in less developed and most EU countries in their sample, Tsou *et al.* (2008) for Taiwanese firms and Golikova *et al.* (2012) for Russian firms. For Portugal, Silva *et al.* (2010a) also confirm the existence of the selection-into-exporting.

In this regard, Alvarez (2007), Greenaway and Kneller (2007) and Monreal-Pérez *et al.* (2012) prove that the most productive firms have the higher likelihood of engaging in external trade; this constitutes evidence for the self-selection effect. Respectively, the mentioned studies are conducted for Chile, UK, and Spain.

Melitz (2003) also shows favourable evidence for the selection-into exporting hypothesis, because the author proves that, in order to export, apart from bearing the necessary trade costs, firms must also have a productivity level higher than a determined cut-off level (which is the minimum productivity level necessary for a firm to export and still be profitable). Besides this exporting productivity threshold, two additional "zero cut-off profit conditions", as Melitz (2003: 1702) call them, are pointed out by the author: the closed and the open economy thresholds. Both thresholds establish the lowest productivity level required for a company to serve (only) the domestic market, but while the former applies to the closed economy, the latter is for the open economy. Therefore, self-selection is a necessary condition not only for companies that will export but also for firms to remain in the domestic market.

In this subject, Alvarez and López (2005: 1397) go further and demonstrate that there is a "conscious" self-selection, i.e., "plants seem to invest in capital either to increase the quality of the goods they produce or to reduce costs of production, with the purpose of becoming exporters". Haidar (2012) also explores this topic with Indian manufacturing firms. The author concludes that firms self-select to enter the foreign markets, but he highlights that there are no proof that this is a conscious process. This means that even if only the best endowed companies are capable of overcoming the great amount of trade costs, it does not seems that firms perform better *ex-ante* with the export activity as their last goal. Nevertheless, three years before exporting, firms that will become exporters already have a productivity advantage of approximately 30% for both periods considered: 1991–1993 and 1998–2000.

Furthermore, there are authors who state that the self-selection effect works in two distinct ways: firms self-select both to enter and to leave the exporting activity. This is the case of Delgado *et al.* (2002), who verify, for Spanish manufacturing firms, that *ex-ante* exporters are already more productive than their exclusively domestic counterparts and that before stopping exporting, "exiting exporters have lower productivity than exporters that remain in the market" (Delgado *et al.*, 2002: 413). Still for Spain, Fariñas and Martín-Marcos (2007) end up with the exact same finding, although using a different methodology (matching). Fariñas and Martín-Marcos (2007) find as well positive evidence for the entry side of the self-selection effect: on average, future exporters already exhibit a higher total factor productivity level (of 3.8%) than non-exporters previously to their export activity.

On the other hand, there are authors presenting non-significant evidence for the selection-into exporting effect. For Indonesia, Blalock and Gertler (2004) prove that before entering the export markets, exporting firms are not more productive than domestic-oriented firms. Contrarily, the productivity gain for exporters only happens after firms start selling overseas. For Sweden, Greenaway *et al.* (2005) confirm this result.

Furthermore, Girma *et al.* (2005) present weak ambiguous evidence when it comes to this effect. Like Helpman *et al.* (2004) found, Girma *et al.* (2005) prove that in terms

of productivity, multinationals (both UK and foreign ones) outperform exporters, which surpass non-exporters. This leads to self-selection because only the most productive companies will bear the high fixed costs and still be profitable. However, when it comes to new firms, there is no evidence for differences between the three types of companies. Girma *et al.* (2005: 215) "interpret this as evidence of uncertainty in the costs and returns to export market entry to the firm". Máñez-Castillejo *et al.* (2010) also provide ambiguous evidence for the selection-into-exporting effect. The authors explored if a productivity threshold for exporting (similar to that mentioned in Melitz (2003)) exists. The conclusion is that: "the exporting threshold put forward by Melitz (2003) is binding for small firms but not for large firms" (Máñez-Castillejo *et al.*, 2010: 337), so it seems that for big companies productivity, despite being crucial, is not the only requirement for entering export markets. Still, with inconclusive evidence for the self-selection hypothesis, Vogel (2011) analyzes the German services sector. The author shows that two years prior to starting to export, future exporters already present higher labour productivity (in terms of turnover per worker by 11% and in terms of value added per employee around 6%) than non-exporters only in the West Germany, while for the East Germany these two types of firms cannot be distinguished. Similarly, in West Germany, this difference deepens in the next two years: the year before engaging in exporting, future starters are 6.3 to 12.8% more productive (in value added per employee and turnover per worker, respectively) and on the entry year the advantage approximately ranges from 7.3 to 14.3% (in the same two measures). Again, results for East Germany remain statistically insignificant.

The self-selection effect is another subject that has originated distinct opinions among the various authors who studied it. Therefore, a structured overview about this theme, as that provided in table 3, is adequate.

Table 3 – Overview of studies about the Self-Selection Effect

References	Country	Sample (Years)	Methodology	Effect	Results
Bernard and Wagner (1997)	Germany	7,624 Plants (1978-1992)	Panel data	+	Exporting firms had better performance even before exporting. Previous firms' features are important for the decision of exporting.
Clerides *et al.* (1998)	Colombia, Mexico, Morocco	1,184 Firms (1981-1991); 2,800 Firms (1986-1990); 882 Firms (1984-1991)	Panel data; Full information maximum likelihood; Generalized method of moments		
Bernard and Jensen (1999)	USA	50,000–60,000 Plants (1984–1992)	Regression; Linear probability models in first differences; Probit		
Isgut (2001)	Colombia	10,747 Plants (1981-1991)	Panel data		
Castellani (2002)	Italy	2,898 Firms (1989-1994)	Cross-section; Probit; Tobit; Quasi-likelihood Estimation Method from Papke and Wooldridge (1996)		
Delgado *et al.* (2002)	Spain	1,766 Firms (1991-1996)	Kolmogorov-Smirnov tests; Kernel estimators		
Bernard *et al.* (2003)	USA	200,000 Firms (1992)	Static Ricardian model of heterogeneous plants and trade; Simulation approach		
Melitz (2003)	∅	∅	Dynamic industry and general equilibrium model; Comparative static analysis		
Bernard and Jensen (2004a)	USA	50,000-60,000 Plants (1983-1992)	Olley-Pakes (1996) production function		
Greenaway and Yu (2004)	UK	461 Firms (1989-1999)	Panel data; IV-difference linear probability model with fixed effects; Probit		
Helpman *et al.* (2004)	USA; 27-38 European countries	961 (narrow sample) - 1,175 (wide sample) Observations (1994)	General Equilibrium Model		
Alvarez and López (2005)	Chile	5,000 Plants (1990-1996)	Panel data; Probit		
Ruane and Sutherland (2005)	Ireland	2,854 Firms (1991-1998)	Random effects panel data regression		
Van Biesebroeck (2005)	9 sub-Saharan African countries	1,916 Firms (1992-1996)	Panel data; OLS; Production function estimation; Maximum likelihood		
Alvarez (2007)	Chile	More than 5,000 Plants (1990-1996)	Multinomial logit model; Probit		
Fariñas and Martín-Marcos (2007)	Spain	1,403 Firms (1990-1999)	OLS; Differences and System General Method of Moments; Propensity Score Matching (nearest neighbour)		

Greenaway and Kneller (2007)	UK	12,875 Observations (1990-1998)	Probit		
Wagner (2007)	34 countries	(1995-2006)	Survey of 54 microeconometric studies		
Wilhelmsson and Kozlov (2007)	Russia	13,123-18,602 Firms (1996-2002)	Pooled OLS; Fixed effects model; System General Method of Moments		
ISGEP (2008)	14 Countries	9,909-1,310,771 Observations (1981-2005) (depending on the country)	Panel data; Pooled OLS; OLS with fixed effects		
Tsou *et al.* (2008)	Taiwan	5,923-9,639 Plants (1986-1996)	OLS; Propensity Score Matching (nearest neighbour, kernel, calliper)		
Silva *et al.* (2010a)	Portugal	4,500 Firms (1996-2003)	Random Effect Probit; OLS		
Yang and Mallick (2010)	China	2,340 Firms (2000-2002)	Propensity Score Matching (kernel, radius, calliper, nearest neighbour)		
Golikova *et al.* (2012)	Russia	499 Observations (2005-2009)	Panel data; Multinomial logistic model		
Haidar (2012)	India	33,510 Firms (1991-2004)	OLS		
Monreal-Pérez *et al.* (2012)	Spain	1,767 Firms (2001-2008)	Panel data; Random effects probit regression; 2SLS; Generalized Method of Moments		
Luong (2013)	China	(1998-2007)	Regression		
Blalock and Gertler (2004)	Indonesia	20,018 Firms (1990-1996)	Fixed-effects estimation	**N.S.**	No productivity difference before exporting.
Greenaway *et al.* (2005)	Sweden	3,570 Firms (1980-1997)	Descriptive statistics; Difference-in-differences; Propensity Score Matching (calliper)		
Girma *et al.* (2005)	UK	3,799 Firms (1990-1996)	Kolmogorov-Smirnov tests	**Ambiguous**	Exporters are more productive than non-exporters, but there are no differences between them when considering new firms.
Máñez-Castillejo *et al.* (2010)	Spain	1.175-1.716 Firms (1991-2002)	Kolmogorov-Smirnov tests; Propensity Score Matching (nearest neighbours, radius and kernel)		
Vogel (2011)	Germany	13,845 (East)-51.780 (West) Observations (2003-2005)	OLS		

Source: Own elaboration.

Although the self-selection phenomenon does not gather consensus in the reviewed literature, this effect is preferred rather than the learning-by-exporting hypothesis as the

most plausible explanation for the superiority of exporting firms compared to exclusively domestic ones, regarding their productivity level. This is actually patent in the literature survey performed by Wagner (2007:66), where the author confirms: "The good go abroad". Thus, we hypothesize that firms serving overseas exhibit a higher *ex-ante* productivity than their domestic counterparts, i.e.:

H.1.3. Exporters are more productive even before entering in the export markets.

Some topics that can influence the learning-by-exporting and the self-selection effects

To scan the link between exporting and productivity, and after providing favourable evidence both for the self-selection and the learning-by-exporting effects, Van Biesebroeck (2005) decided to explore some issues that could influence this phenomenon. He ascertains two pertinent themes, especially in the context of his sample of sub-Saharan African countries: returns to scale and credit constraints. For the former, Van Biesebroeck (2005) finds that it plays a role separating exporters and non-exporters, as his estimations for the returns to scale prove that exporters have constant returns to scale (1.08) and domestic-oriented firms have increasing returns to scale (1.17). For the author the explanation beneath this result is that "exporters have exhausted scale economies, while non-exporters are producing at a point on the production frontier with significant increasing returns to scale" (Van Biesebroeck, 2005: 390). Regarding the latter matter, the author concludes that credit constraints are a greater limitation for purely domestic firms, as they serve a narrower market and face a higher average receiving time from their clients. This makes non-exporters a riskier credit candidate and can thus constitute an obstacle to their development. Succinctly, Van Biesebroeck (2005: 390) states that "Exporting also solves the "lack of demand" problem that many firms report, (...) provides access to a more reliable client base and to institutions that specifically deal with credit risks associated with foreign trade".

The exit side

To close the section related to productivity, it is also noteworthy that there are some authors that besides analysing the entry into the export markets, study as well what

happens to firms once they leave international markets. This is the case of Bernard and Jensen (2004a), who prove that the productivity level of exporters exiting the export activity ranges between that of exporters and non-exporters. This means that the exiting exporters tend to be less productive than continuous exporters even before they abandon the export activity. After the exit, this situation gets even worst with the productivity level of "export failures", as Bernard and Jensen (2004a: 346) call them, dropping considerably and converging to the productivity of non-exporters. These authors also verify that exporters heading to leave the international markets have an inferior productivity growth than that of non-exporters (by 0.2 to 0.9%). This way they confirm the conclusion of Bernard and Jensen (1999: 24) that "Entry and exit are associated with large changes for the plant. Entry is a time of growth and improved performance, while plants that stop exporting perform poorly". This idea is also evident in the study of Bernard and Wagner (1997) and Delgado *et al.* (2002) that confirm that firms ceasing their export activity are less productive than non-exporters.

1.2. **Profitability**

Regarding profitability, Fryges and Wagner (2010: 418) demonstrate that there is an exporter profitability premium, i.e., "exporting leads to a higher rate of profit", with the rate of profit being defined by Fryges and Wagner (2010: 402-403) and by Vogel and Wagner (2009: 8) as:

> "The rate of profit of a firm is computed as a rate of return, defined as gross firm surplus (computed in line with the definition of the European Commission (1998) as gross value added at factor costs minus gross wages and salaries minus costs for social insurance paid by the firm) divided by total sales (net of VAT) minus net change of inventories".

According to this result, the exporter productivity premium, which generates a productivity gain for exporters, allows them to face all the costs of internationalization (including the higher wages) and still have profit afterwards. This finding is clear when analysing the sample's mean values, when performing a t-Test and a Kolmogorov-Smirnov test and when estimating both a pooled data and a fixed effects model. Though, it is worth underlying that the rate of profit for exporters is superior to that of non-exporters by a very narrow margin (only by 1 percentage point in the pooled

model). However, the authors prove (with the pooled and the fixed effects model and a generalized propensity score methodology) that the relationship between the rate of profit and the export-sales ratio resembles an inverse U-shaped relation. Thus, profit increases until it hits the maximum (that the authors denominate threshold of internationalization and happens for firms that export 49% of their sales), from which rate of profit decreases. Fryges and Wagner (2010) highlight that even in the decreasing stage of the curve exporters are more profitable than non-exporters (except for the sub-interval from 89 to 100%, where only a minority of cases falls). Fryges and Wagner (2010: 417) refer that "firms that generate an export intensity of at least 89 per cent do not benefit from a higher rate of profit if compared with non-exporting firms".

Melitz (2003) and Egger and Kreickemeier (2010) also agree with the idea that exporters are more profitable than non-exporters because they are also more productive. The same finding is provided by Ruane and Sutherland (2005) for Ireland, measuring profitability with the gross value added per worker, both analysing the sample's mean values and controlling for a range of firm's characteristics (exporters are 7.7% more profitable). Providing a different view on this issue, Kneller and Pisu (2010) find, based on a survey of UK manufacturing firms, that starting to sell abroad generates higher profitability for exporting companies. More, the authors verify that it is due to a higher volume of sales (given the larger variety of markets served by the company) and not due to higher prices. Furthermore, Kneller and Pisu (2010) show that, besides this *ex-post* effect of exporting occurring for both export entrants and continuous exporters, it is greater for the latter firms. The fact that export starters are less profitable than older exporters might be correlated with another result of Kneller and Pisu (2010): the firms that just entered the export markets for the first time exhibit higher product development and generally have a lower export-sales ratio than experienced exporters.

On the contrary, Girma *et al.* (2004) have another opinion on this issue: They find that in Ireland there are no significant differences between domestic exporters and non-exporters concerning profit per employee (but that they are both less profitable than domestic multinationals).

Helpman *et al.* (2004) go further, referring that exporters are less profitable than firms serving only their domestic market. They explain that, to stay in the market

producing, a company incurs in fixed costs and the same happens with firms that internationalize. Hence, the profit of non-exporters is higher because their fixed costs are lower than the fixed costs needed to start exporting, once exporting firms are producing for both domestic and foreign markets. The same opinion is shared by Vogel and Wagner (2009) who find, for the German business services sector, that selling abroad makes the companies less profitable than serving exclusively the home market. This conclusion holds for the various methods used, namely an estimation using pooled data and a generalized propensity score methodology. They prove that exporters' rate of profit is surpassed by that of purely domestic firms in approximately 4 and 0.7 percentage points, when considering the pooled data model without and with fixed effects, respectively. Still, Vogel and Wagner (2009: 12): "The negative exporter premia found in regression models using pooled data for exporters and non-exporters cannot be interpreted as indicators for a negative causal effect of exporting on profitability". Still, from this method another conclusion arises: it appears that there is a quadratic relationship between the rate of profit and the export-sales ratio. However, when including another variables, it seems more likely that such relationship is of an S-shaped type, i.e., in a first stage when the export intensity rises, the rate of profit decreases until it hits the minimum for the 32% of exports over total sales and thereafter, the rate of profit increases until its maximum, registered for the export-sales ratio of 78%. This finding also emerges when the authors perform an estimation of the dose-response function for the more specific relationship between the export intensity of 2004 and the rate of profit of 2005: the only difference is that the maximum registered for an export-sales ratio of 44%. Furthermore, Vogel and Wagner (2009) discover that this negative profitability premium of exporters is patent even two years before these firms enter the external markets and it is about 4 percentage points when comparing to non-exporters. In short, Vogel and Wagner (2009: 23-24) refer that "in the services sector (but not in manufacturing) any cost advantage due to higher productivity is "eaten up" by higher costs related to export activities, or by higher wages paid in exporting compared to non-exporting firms".

Similarly, still for the German business services sector, Vogel (2011) concludes that, both in East and West Germany: regarding turnover profitability, exporters have a poorer performance than purely domestic firms. This finding is valid when the author

simply analyzes the average values of his sample and when he employs two different methods of estimation (with and without controls for the amount of workers): in the pooled regression exporting companies are approximately 3 percentage points less profitable than non-exporters and in the fixed effects model the unfavourable difference is about 1 pp. Moreover, Vogel (2011) investigated the profitability in the pre-entry into the export markets period. Still, he finds that even one and two years prior to entry, future exporters are already about 2 percentage points less profitable than domestic-oriented companies in West Germany; more, this difference increases to 3 pp in the entry year. In East Germany there are no considerable differences between the two groups.

Still, Grazzi (2012) finds ambiguous evidence regarding profitability: for some sectors and years, exporters are more profitable than non-exporters, but for others non-exporters surpass the firms selling abroad regarding their return on sales. In an attempt to justify this situation, the author provides two possible explanations. Firstly, Grazzi (2012) states that selling in international markets entails significant costs which can prevent exporters from being profitable. Alternatively, it might be the case that "the fraction of smaller, not exporting firms might serve some residual market niches, so that their profitability is not squeezed by competitors (both at national and international level)" (Grazzi, 2012: 434). Vu *et al.* (2004) also find uncertain results for Vietnam. The authors prove that contrarily to the OLS approach (which showed no considerable differences), when using a quantile regression, there are differences between exporters and non-exporters regarding their profitability growth. Particularly, exporters have a higher profit growth in percentiles 70 and 80, but lower for the percentile 10. Vu *et al.* (2014: 444) explain that this is due to the higher productivity of the firms selling overseas, but "for firms with low profit growth at 10th percentile, these advantages are possibly absorbed by costs relating to trading activities on overseas markets such as entry costs and advertisement costs". More, Vu *et al.* (2014) prove that the profitability growth is greater for larger, young and innovative companies.

In a related issue, for Germany, Vogel and Wagner (2009) and Fryges and Wagner (2010) went further and ascertained the existence of a self-selection effect with

profitability (and not considering productivity as usual). Both studies end up with the same conclusion: there is no evidence for a self-selection effect regarding profitability, i.e., it is not the most profitable firms that are more likely to start exporting.

Table 4 - presented below – synthesizes, in a structured way, the diverse opinions in the literature regarding the relationship between profitability and the exporting activity.

Table 4 – Overview of studies about the Exporter Profitability Premium

References	Country	Sample (Years)	Methodology	Effect	Results
Melitz (2003)	∅	∅	Dynamic industry and general equilibrium model; Comparative static analysis	+	Exporters are more profitable than non-exporters.
Ruane and Sutherland (2005)	Ireland	2,854 Firms (1991-1998)	Descriptive statistics; Random effects panel data regression		
Fryges and Wagner (2010)	Germany	14,983-16,775 Firms (1999-2004)	Descriptive statistics; Kolmogorov-Smirnov tests; OLS; Pooled data regression; Fixed enterprise effects model; Fractional logit model; Generalised propensity score		
Egger and Kreickemeier (2010)	∅	∅	General equilibrium model		
Kneller and Pisu (2010)	UK	343 Observations (2005)	Survey data; Factor analysis; Probit		
Girma *et al.* (2004)	Republic of Ireland	Observations: 307 DN, 647 DE, 246 MN (2000)[4]	Descriptive statistics; Kolmogorov-Smirnov tests	**N.S.**	No significant differences between exporters and non-exporters regarding profitability.
Helpman *et al.* (2004)	USA; 27-38 European countries	961 (narrow sample) - 1,175 (wide sample) Observations (1994)	General Equilibrium Model	-	Exporters are less profitable than non-exporters.
Vogel and Wagner (2009)	Germany	23,076-24,934 Firms (2003-2005)	Pooled data regression; Fixed enterprise effects model; OLS; Fractional logit model; Generalized propensity score		
Vogel (2011)	Germany	13,845	Descriptive statistics; Panel		

[4] DN = Domestic Non-exporters, DE = Domestic Exporters, MN = Domestic Multinationals.

		(East)-51.780 (West) Observations (2003-2005)	data; Pooled regression; Fixed effects model; OLS		
Grazzi (2012)	Italy	60,000 Firms (1989-2004)	Non-parametric methods: Fligner-Policello test; Pooled OLS	**Ambiguous**	Exporters are more profitable than non-exporters in some sectors and years, but in others it is quite the contrary.
Wagner (2012)	5 countries	(2008-2011)	Survey of 9 empirical studies		
Vu *et al.* (2014)	Vietnam	2,821, 2,635 and 2,655 Firms (for 2005, 2007 and 2009, respectively)	OLS; Fixed effects quantile regression		

Source: Own elaboration.

Profitability is possibly the most divergent measure of performance given its very conflicting results, as emphasized in the survey performed by Wagner (2012). Yet, the majority of the studies reviewed in the section are in favour of a positive exporter profitability premium. Hence, based on extant literature, we hypothesize that

H.2. Exporters are more profitable than non-exporters.

1.3. Characteristics – Wages, size and age

As mentioned earlier, it is possible to establish relevant differences between companies selling abroad and selling only in the domestic market in terms of their characteristics as well. At this stage it is important to clarify that there are some authors that classify companies' wages, size and age as performance measures (such as Girma *et al.*, 2004; Kneller and Pisu, 2010; Grazzi, 2012). There are still some authors that consider them as being performance characteristics (e.g., Bernard and Jensen, 1995, 1999; Wagner, 2002; Greenaway *et al.*, 2005; Ruane and Sutherland, 2005; Wilhelmsson and Kozlov, 2007). However, in this dissertation, as in the greatest majority of the studies, wages, size and age are considered firm characteristics (Bernard and Jensen, 1997, 2004a, 2004b; Isgut, 2001; Nassimbeni, 2001; Alvarez and López, 2005; Yasar and Rejesus, 2005; Bernard *et al.*, 2006; Alvarez, 2007; De Loecker, 2007; Fariñas and Martín-Marcos, 2007; Greenaway and Kneller, 2007; Schank *et al.*, 2007; ISGEP, 2008; Tsou *et al.*, 2008; Vogel and Wagner, 2009; Fryges and Wagner, 2010;

Yang and Mallick, 2010; Vogel, 2011; Golikova *et al.*, 2012; Haidar, 2012; Stöllinger *et al.*, 2012; Fu and Wu, 2013; Vu *et al.*, 2014).

1.3.1. Wages

In what concerns wages, there are authors like Egger and Kreickemeier (2010) and Stöllinger *et al.* (2012), that find evidence about the exporter wage premium, i.e. the reasoning that, exporters are more productive than non-exporters, which will lead to greater profits, so they will pay higher wages to their employees. Regarding their sample's descriptive statistics, Greenaway *et al.* (2005) verify, for Sweden, that exporters display a higher average wage than non-exporters. Bernard and Wagner (1997), who investigated this issue, find that companies that export remunerate 2.6% more their employees than non-internationalized firms. This is true especially for highly qualified workers, both for descriptive statistics and when estimating the wage premium (white-collars receive 3.3% more, while for non-production workers there are no differences). (Isgut (2001) also agrees with this argument stating that exporters pay higher wages to their workers because their labour productivity is superior. On this issue, Schank *et al.* (2007) add that the wage increases with the increment of the export-sales ratio, i.e., the bigger the proportion of exportation on a firm's total sales, the higher the augmentation of the wage paid both for high and low qualified employees. For instance, "an increase in the proportion of exports by 10 percentage points increases the wage of a blue-collar (white-collar) worker by 0.3 (0.15) %" (Schank *et al.*, 2007: 61). Likewise, Alvarez and López (2005) who find that companies that export pay wages that are 20% higher to both blue (15%) and white-collar (30%) workers. Other authors also measured this difference, e.g., De Loecker (2007) for Slovenia and Tsou *et al.* (2008) for Taiwan, who prove that wages are 16.14% and about 19% (both in 1991 and 1996) greater, respectively. Greenaway and Yu (2004) quantified the exporter wage premium in the chemical industry in the UK, both analysing their sample's average values and through an estimation. The conclusion is that firms internationalized trough exports have the ability to pay 6.43% higher wages to their employees. As a complement, Greenaway and Yu (2004) add that this result is also valid in other manufactures (4.46% bigger wages for exporters). Similarly, Fariñas and Martín-Marcos (2007) prove as well, both analysing the sample's statistics and estimating the

difference between exporting and non-exporting firms controlling for several variables (foreign ownership, industry, age, size and time) that exporters' average wages per hour exceed those of their purely domestic counterparts by 35% (14.6€ vs. 10.8€) for the former approach or by 6% for the latter. Also providing the sample's average values and estimating the average wages controlling for some variables, Ruane and Sutherland (2005), conclude, for Ireland, that the wages in firms selling overseas are more advantageous than those paid in purely domestic companies (by 5.7%). Similarly, when performing a regression, Alvarez (2007) observes a favourable difference for Chilean sporadic exporters when compared to non-exporters of about 17% for average wages, 23% for wages of more qualified workers and 11% for wages for production employees. Alvarez (2007) also add that permanent exporters pay even more to their employees than sporadic exporters (average wages: more 16%, non-production wages: more 18%; production wages: more 13%).

Van Biesebroeck (2005) corroborates this finding for several African countries, verifying that the wages per worker are 34.2% more favourable in exporting firms than in those that do not export. Still for a less developed country, Haidar (2012), in his study for Indian manufacturing firms, also provides evidence, when analyzing the average values of his sample, that exporters pay higher wages then their solely domestic counterparts. Then, the author analyzes a wage-related measure: the unit labour cost, which he defines as being "obtained by dividing total labour cost (salaries and wages) by the value of real output" (Haidar, 2012: 1767). Thus, through OLS estimates, the author proves that firms that export exhibit a more advantageous unit labour cost than non-exporters (in every year of the sample), and after applying matching techniques Haidar (2012) even observe a decrease of this measure for exporters in their first years selling overseas, but it is statistically negligible. Bernard and Jensen (1999) also agree that exporting companies (in USA) pay higher wages when compared to non-exporting firms (by 11.2-17.9% between 1984-1992). More, they prove that three years before exporting, future exporters already have a 2.6-4.4% higher wage level than non-exporters, and this is true especially for high qualified workers (1.9-5.1%). Still, in the pre-entry period, exporters' wages are practically stable, without a significant growth. Yet, after start selling abroad, the results are mixed: wages grow less for new exporters than for non-exporters (both in short and long horizons), but comparing distinct groups

of firms, export entrants outperform continuous exporters and domestic-oriented companies. In short, most authors agree with the finding of Bernard and Jensen (1995: 70), on their first study on this issue that "exporting establishments pay wages that are more than 14 percent higher than those paid by non-exporting plants".

The aforecited authors have conducted studies concerning the manufacturing sector. However, Vogel (2011) proves that it is possible to verify the existence of an exporter wage premium in the German business services sector. The author finds that this conclusion emerges not only for the sample's average values, but also when estimating. Employing a pooled regression, Vogel (2011) shows that after controlling for employment, exporters pay approximately 15% higher wages to their workforce than exclusively domestic firms, in both West and East Germany, but when using a fixed effects model there are no considerable differences distinguishing the two kinds of companies. More, Vogel (2011) also ascertained if this wage advantage already existed before exporters start selling abroad. The answer was positive for West Germany: two years prior to the beginning of exports, the average wages of future exporting companies surpassed those of non-exporters by about 6.6% (after controlling for the number of workers). In East Germany, again, no statistically significant differences were found, and Vogel (2011: 1026) points out as a possible justification the "small number (less than 100) of East German business services enterprises that began to export".

Related to this issue, Bernard and Jensen (1997), in their study of US plants, try to explain the skill upgrading in labour force composition and consequent increase in the wage gap between blue and white-collar workers during the 1980s. The authors analyze two possible explanations, one related to demand and other concerning technological change. Bernard and Jensen (1997: 7) also distinguish two effects: the between effect regarding "movements of workers between industries or plants" and the within effect, which is related to "changes in proportion of non-production employment or wages within the industry or plant". The major conclusions are that "the major shifts from the 1970s to the 1980s are associated with between plant movements" (Bernard and Jensen, 1997: 27). Bernard and Jensen (1997: 16) add that "combining the between and within components, we find that exporters contribute 68% of the employment share changes and 76% of the wage bill changes within the sample". With this finding, the authors

refute others studies that deny any contribution of export status for this phenomenon. A last important result is that shifts of demand to more skill-intensive goods are the "major source of the wage gap. Technology variables are positively associated with skill-upgrading at the plant level, but do not contribute to employment shifts across plants" (Bernard and Jensen, 1997: 28).

In his study for German firms, Wagner (2002) provides a complete overview regarding wages studying not only their level but also their growth with three different methods and comparing exporting and non-exporting companies. The author ascertain that one year before exporting, firms that sell abroad already perform better in terms of the average wage per employee than those selling just domestically. This finding is valid for two methods: both the sample's mean values and the OLS estimates (that show a superiority of 3.9% for exporters). However, contrarily, when applying the matching method (a more solid method than the previous two), Wagner (2002) proves that indeed there are no significant differences between firms that do and do not export for the average wage per worker. Moreover, the author investigates the evolution of the average wage from one year before starting to export until three years after that, and the results are unanimous: new exporters have a higher growth of average wage per employee than non-exporters. Yasar and Rejesus (2005) find likewise, that after matching the firms, in terms of total wages, new exporters do not differ significantly from their domestic-oriented counterparts.

Still, one of the most detailed analyses regarding wages is provided by Fu and Wu (2013) for China. Firstly, when studying the sample's mean values, the authors verify that, on average, wages in exporting firms are 15% superior to that of non-exporting companies. However, when they separate their sample into two sub-groups, they find that foreign firms pay higher wages than domestic firms, but while in the latter exporters' wages exceed those of non-exporters (by 12.7%), in the former it is quite the opposite (-11.5%). Then, in order to ascertain the influence of some variables on wage, the authors apply an OLS regression, a robust regression and a quantile regression. The findings prove that indeed, on average, exporting has a positive effect on wages (around 2.4%), but this is not true for the foreign owned companies, where firms selling overseas have a around 3.8% smaller wages than those of companies selling only in their home market. Fu and Wu (2013) add that the higher the company's size, age,

productivity, capital intensity and share of qualified employees, the greater is the wage. Contrarily, the higher the share of female workers in a firm, the lower will be its wages. Furthermore, distinguishing firms by their ownership, Fu and Wu (2013) also discover that there are differences in wages according to this variable. For instance, in companies owned by OECD countries, exporters over perform their purely domestic counterparts by 3.6%. The same happens for state-owned and non-state-owned firms, by 13.8% and 1.8%, respectively. The only exception is for firms from Hong Kong, Macau and Taiwan, where wages are 7% more unfavourable in exporters than in non-exporters. One last important result to highlight is that for firms situated in coastal regions, it is possible to verify a positive effect of exporting on wages (i.e., exporter's wages are superior to non-exporters'). Overall, Fu and Wu (2013) provide ambiguous evidence for the exporter wage premium, once they state that the export wage premium "is related to the heterogeneous characteristics of the firms such as ownership, export-orientation and locations" (Fu and Wu, 2013: 182).

Also analysing an African country (Kenya) Were and Kayizzi-Mugerwa (2009) explore the influence of several variables (including export status) on wages. Their findings provide ambiguous evidence for the existence of an exporter wage premium. Whilst in 1995 exporters paid higher wages than firms serving only their home market (by 14 to 30%, depending on the model considered), in 2003 this advantage decreases for only 11% and after controlling for additional variables (as productivity, union status, location and occupation) the exporting activity seems not to be a determinant of wages. Were and Kayizzi-Mugerwa (2009: 446) justify: "while better wages were important in attracting workers to the export sector at the beginning of trade liberalization, increased competition for skilled workers raised wages more generally across the manufacturing sector, while also forcing firms to reduce labour costs".

Table 5 sums up the overall conclusions of all the studies analyzed in this section.

Table 5 – Overview of studies about the Exporter Wage Premium

References	Country	Sample (Years)	Methodology	Effect	Results
Bernard and Jensen (1995)	USA	408,442-411,574 Observations (1976-1987)	Descriptive statistics; OLS; OLS with fixed effects	+	Exporters pay higher wages than non-exporters.
Bernard and Jensen (1999)	USA	50,000–60,000 Plants (1984–1992)	Regression		
Isgut (2001)	Colombia	10.747 Plants (1981-1991)	Panel data		
Greenaway and Yu (2004)	UK	461 Firms (1989-1999)	Descriptive statistics; Panel data		
Alvarez and López (2005)	Chile	5,000 Plants (1990-1996)	Panel data		
Greenaway *et al.* (2005)	Sweden	3,570 Firms (1980-1997)	Descriptive statistics		
Ruane and Sutherland (2005)	Ireland	2,854 Firms (1991-1998)	Descriptive statistics; Random effects panel data regression		
Van Biesebroeck (2005)	9 sub-Saharan African countries	1,916 Firms (1992-1996)	Panel data; OLS		
Alvarez (2007)	Chile	More than 5,000 Plants (1990-1996)	Regression		
De Loecker (2007)	Slovenia	6,391 Firms (1994-2000)	OLS		
Fariñas and Martín-Marcos (2007)	Spain	1,403 Firms (1990-1999)	Descriptive statistics; Regression		
Schank *et al.* (2007)	Germany	1.262 Firms (1995-1997)	Multiple imputation; OLS and plant-fixed effects		
Tsou *et al.* (2008)	Taiwan	5,923-9,639 Plants (1986-1996)	Descriptive statistics		
Egger and Kreickemeier (2010)	∅	∅	General equilibrium model		
Vogel (2011)	Germany	13,845 (East)-51.780 (West) Observations (2003-2005)	Descriptive statistics; Panel data; Pooled regression; Fixed effects model		
Haidar (2012)	India	33,510 Firms (1991-2004)	Descriptive statistics; OLS		
Stöllinger *et al.* (2012)	Austria	6,000-6,300 Firms (2002-2006)	OLS		
Wagner (2002)	Germany	9,425 Firms (1978-1989)	Descriptive statistics; OLS; Panel data; Propensity Score Matching (nearest neighbour)	**N.S.**	No significant differences between exporters' and non-
Yasar and Rejesus (2005)	Turkey	5,805 Observations	Propensity Score Matching		

		(1990-1996)			exporters' wages.
Were and Kayizzi-Mugerwa (2009)	Kenya	282 Firms (1995 and 2003)	OLS	**Ambiguous**	Exporters pay higher wages than non-exporters under some conditions, but under others it is quite the opposite.
Wagner (2012)	7 countries	(2006-2010)	Survey of 10 empirical studies		
Fu and Wu (2013)	China	879,000 Firms (2004)	Descriptive statistics; OLS; Robust regression; Quantile regression; Non-parametric matching methods		

Source: Own elaboration.

Most of the literature agrees that exporters are the most productive firms. Hence, it would be expected that companies supplying foreign markets also reward better their workforce. Despite the lack of an absolute consensus (Wagner, 2012), this idea is patent in the literature review performed in this section for wages: the majority of the authors conclude that exporter's wages are higher. Hence, we hypothesize that

H.3.1. Exporters pay higher wages than non-exporters.

1.3.2. Size

Concerning another characteristic of the firms, size, most of the studies agree with the conclusion of Bernard and Jensen (1995: 76) that "plant size is substantially larger for exporters (253 employees on average) than for non-exporters (58 employees)". More, after controlling for size, industry and location, these authors show that exporters employ 93.6% more workers than non-exporters. Related, they also prove that exporting firms employ 12.4% more qualified workers than non-exporters. Applying a similar methodology, Stöllinger *et al.* (2012) also find an exporter premium for size (considering sales).

Aw and Hwang (1995), Bernard and Wagner (1997), Isgut (2001), Blalock and Gertler (2004), Ruane and Sutherland (2005) and Fariñas and Martín-Marcos (2007) also find the same for Taiwan (213.2 vs. 26.1), Germany (259 vs. 67 in 1978 and 257 vs. 66 in 1992), Colombia (213 vs. 53), Indonesia (251.95 vs. 65.03), Ireland (73 vs. 38) and Spain (252 vs. 51), respectively. In addition, Bernard and Wagner (1997) also ran a regression and conclude that employment is 71.75% higher in exporters than in non-

exporters. Still considering descriptive statistics, Golikova *et al.* (2012) show that, on average, Russian continuing exporters (984) surpass new export starters (417) that in turn surpass purely domestic companies (342) in terms of number of employees.

In another study for Chinese manufacturing firms, Fu and Wu (2013) confirm, for three different measures that on average firms engaged in exports have a higher size than those serving only their domestic market. Firstly, they analyzed the number of employees (85 vs. 26), then the amount of sales (15,722 vs. 2,453 in thousand of Chinese Yuan) and finally the total assets (20,147 vs. 2,679 in thousand of Chinese Yuan). Still in the same vein, Bernard and Jensen (1999) prove, for the USA, that exporters have a greater amount of workers between 77.6-95.2% (for the period 1984-1992) and ship more than purely domestic firms. Additionally, they prove that this advantage already exists in the years prior to entry both in terms of levels (advantage of 27-55% for employment and of 27-55% for shipments) and annual growth rates (1.4% for employment; 2.4% for shipments). This good performance is also maintained for the period after starting to export. In a study for China, Yang and Mallick (2010) prove that exporters employ 29.1% more workers and sell 22.3% more than non-exporters. More, they prove that in the year preceding entry in the export markets, exporters are already bigger (29.7% for employment and 46.9% for sales). This advantage deepens until two years after entry, when internationalized companies show a faster growth for employment and sales (14.7 and 43.8%, respectively) than domestic-oriented companies.

Aw and Hwang (1995) add that exporters are larger when using value of sales and value added as measures for size. These authors present some possible explanations for this fact. Aw and Hwang (1995: 330) state that "exporting firms are bigger due, perhaps, to their better access to new, improved technology. In addition, bigger firms that are not already exporting are more likely to do so if they face downward-sloping domestic demand schedules, since they have the necessary resources to incur the extra costs of diversifying into foreign markets".

Bernard *et al.* (2003: 1278) also prove that exporting companies are larger than their exclusively domestic counterparts and they state that it is due to the fact that exporters besides serving external markets, also supply their home market (where according to the authors, their sales tend to surpass those of non-exporting firms). Grazzi (2012) and

Haidar (2012) verify, for Italy and India, respectively, that exporting companies have a greater amount of sales, so they are bigger than firms that do not export. Haidar (2012) finds as well that start selling overseas boosts the export starters' sales, once their sales growth is about 11.4% higher during the first three years after entry, contrarily to Grazzi (2012) that proves that the sales growth does not happen for every sector or year considered. Tsou *et al.* (2008) prove, concerning descriptive statistics for employment) that the size of Taiwanese exporting plants is approximately six times greater than that of non-exporters. Alvarez and López (2005) also quantify this effect for Chile, stating that exporters are larger concerning their sales and their value added by 60% and they add that firms that are larger or part of a multinational are more likely to start exporting. Still for Chilean firms, Alvarez (2007) corroborates this finding: sporadic exporters are larger than non-exporters in terms of employment (15%), sales (52%) and value added (48%). Furthermore, he finds as well that permanent exporters employ 15% more workers, sell 42% more and show a 43% higher value added than sporadic exporters. Alvarez (2007) add that size, together with foreign capital participation, are the main factors distinguishing permanent and sporadic exporters. Concerning the mean values for both value added and employment, Damijan and Kostevc (2006) prove that Slovenian exporters engaged in outward FDI are bigger than domestic exporters, which in turn are larger than purely domestic-oriented companies.

Bernard and Jensen (2004b) point out that the probability to start exporting increases with the size of the firms. More, De Loecker (2007: 74) refers that exporters "operate on a larger scale" in Slovenia, once they have 58.63% higher sales and Wilhelmsson and Kozlov (2007) verify that, in Russia, exporters are larger in terms of employment and sales, both in the descriptive statistics and in the Pooled OLS and fixed effects estimation. Using both the amount of domestic sales and the total employment, Van Biesebroeck (2005) provide evidence for a size advantage for firms selling overseas by 260% for the former measure and about three times for the latter. More, the author also verifies that companies serving foreign markets display a 53.4% greater amount of sales per employee. Similarly, Kneller and Pisu (2010) find, for UK manufacturing firms, that the majority of firms selling overseas enjoy an increase in their size measured by volume of sales. The authors also verify that this effect is stronger for long-time exporters than for starters, because the former tend to be more

export-intensive than the latter (which might be due to their greater experience on foreign markets).

Bernard and Jensen (2004a) use the growth rates of employment and shipments (both foreign and domestic) to study the size of the companies. They find that for all three measures, firms serving international markets perform better than non-exporters and this is true both for continuous and new exporters. In the case of employment, continuous exporters have a higher rate of growth around 2 to 4% and new exporters, besides starting with a lower level (before entry), after start selling abroad converges to the value of continuous exporters. Aggregately, exporters exhibit higher employment growth of approximately 0.79 to 1.08% per year. The results are similar for the growth of shipments, with exporters over performing non-exporters both regarding total shipments (by 0.57 to 1.32%) and domestic shipments (by 2 to 4%).

Besides the most common measures for size, such as employment and sales value, there are authors who use other variables. It is the case of Fariñas and Martín-Marcos (2007) that (after looking at the number of employees) focus on output and capital stock to evaluate size – via descriptive statistics. Even with these alternative measures, exporters are still superior in size than exclusively domestic enterprises by six and a half times for production or by five and a half times for capital stock. More, this finding also holds when Fariñas and Martín-Marcos (2007) estimate this effect, controlling for various firm's characteristics, although the advantage notably decreases for production (only 3 times bigger). The same is true for a more accurate approach, the estimation with a Generalised Method of Moments: "after conditioning on inputs, exporters have about 5.8 per cent more output than non-exporters" (Fariñas and Martín-Marcos, 2007: 632). Similarly, Greenaway *et al.* (2005), prove, concerning descriptive statistics, that Swedish exporters present higher output (by 1.7 times) and employment (by 20%) than purely domestic companies. With another variable for measuring size, the enterprise's turnover, Ruane and Sutherland (2005) came to the same conclusion for Ireland: exporters are bigger than firms supplying only their domestic market. It is important to note that, after accounting for a series of variables (time, sector, size, firm-specific effects), this finding still holds (exporters are 16.3% larger). As the majority of the studies use the number of employees to measure size, it is pertinent to highlight that the presence of temporary workers among the employees has a negative effect in both

export propensity and innovation of the company, as Monreal-Pérez *et al.* (2012) emphasize. Related to this issue, Ruane and Sutherland (2005), Fariñas and Martín-Marcos (2007) and Tsou *et al.* (2008) also find that, when compared to firms operating only in the domestic market, the employment of skilled workers is greater for exporters in Ireland (exporters have a greater share of skilled employees by 6.2%), Spain (10.7% vs. 6.6%) and Taiwan (28% vs. 24%). In fact, they confirm the finding of Bernard and Wagner (1997), who state that three years before firms start exporting exporters employed more skilled workers (4.2%) than firms that do not export. Fu and Wu (2013) add that exporters exceed non-exporters in terms of their share of female employees, but have a lower amount of low-qualified labour.

Concerning size, Wagner (1995) finds that the larger the firm, the higher the export intensity (and the probability to export), i.e., larger firms are those with greater export-sales ratio. Nassimbeni (2001), in his study for small Italian firms, endorses the idea that companies that export are larger than domestic-oriented ones, both in terms of number of employees (16.73 vs. 15.24) and value of sales (1.53 millions of Euros vs. 0.89 millions €). This author also proves that companies' size is the most important variable influencing the export propensity and intensity, adding that "a U-shape relationship between size and export intensity is confirmed" (Nassimbeni, 2001: 258), i.e., the higher the proportion of exports on the firm's total sales, the bigger the firm's size. Furthermore, Monreal-Pérez *et al.* (2012: 872) show that "size is positively related to both export activity and the ability to obtain innovation outputs".

All the mentioned authors evaluated the size variable considering only manufacturing firms. Yet, it is pertinent to stress a similar study conducted for the business services sector by Vogel (2011) in Germany. This author proves that even for services, exporting firms are larger than non-exporters, not only when it comes to their number of employees but also for the total turnover. This conclusion holds for both his sample's average values, but also when estimating through a pooled regression and through a fixed effects model. For the former model, the results show that exporters' total employment surpass that of non-exporters by 56.8% and 49.8% for West and East Germany, respectively and regarding the total turnover, exporters' advantage is about 40% (after controlling for the number of employees) in both parts of the country. Considering the fixed effects model, the conclusion holds, but the advantages are lower:

2.5% for total employment for West Germany (the difference is insignificant for the East) and 2% and 3.3% for turnover (respectively for West and East Germany). More, Vogel (2011) proves that even two years before entry in the foreign markets, exporting firms already had a 24% greater size in terms of total employment and a approximately 20% superiority for total turnover, in both parts of Germany.

Wagner (2002) provides evidence of insignificant differences in firm's size. Firstly, the author verifies that exporter's size exceeds that of non-exporters, simply observing the mean values of his sample of German firms (in terms of number of workers: 91.87 vs. 55.56), then with the OLS estimates (exporters are bigger than non-exporters by 34.48%). Nevertheless, the author has also conducted a matching approach (which is more rigorous than the other ones) where he concludes that no significant differences separate these two types of company. After analysing its level, Wagner (2002) studied as well how the employment progress since one year before exporters initiate their activity abroad until three years after they are selling in foreign markets. He has come to a consistent result in all three methods. Indeed, new exporters exhibit a much higher rate of growth of the size than firms selling exclusively in their home country (mean values: 11.62% vs. -0.42%; matching approach: 11.54% vs. -1.78%; OLS estimates: a 9.56% higher rate of growth). Yasar and Rejesus (2005) also prove that after matching, in terms of total employment, exporters and non-exporters do not exhibit considerable differences in terms of their size.

Providing an outstanding finding regarding size, Greenaway and Yu (2004), who focus their study in the UK's chemical industry, state that exporting firms, contrarily to the common sense's opinion, are smaller than purely domestic companies. Firstly, this pattern emerges with the simple analysis of the average values of their sample: exporters' have a 10% lower amount of sales and a 13% smaller value added, and employ 14% less workers than their solely domestic counterparts. More robustly, when estimating, Greenaway and Yu (2004) still find that estimation: exporters' employment and value added are lower than those of non-exporters, but this difference is statistically insignificant. Just to compare these results, Greenaway and Yu (2004) verify that this is not the case of other manufactures, where exporters are larger.

After a comprehensive literature review about the link between exporting and firm size, it is pertinent to present a clear synopsis before introducing the hypothesis of this section. That is done in table 6 below.

Table 6 – Overview of studies focusing on the link between exporting and size

References	Country	Sample (Years)	Methodology	Effect	Results
Aw and Hwang (1995)	Taiwan	2,384 Firms (1986)	Descriptive statistics	+	Exporters are larger than non-exporters.
Bernard and Jensen (1995)	USA	408,442-411,574 Observations (1976-1987)	Descriptive statistics; OLS		
Wagner (1995)	Germany	7,000 Firms (1978-1989)	Tobit; Panel data: pooled model, pooled model with firm dummies and pooled model with time dummies		
Bernard and Wagner (1997)	Germany	7,624 Plants (1978-1992)	Panel data		
Bernard and Jensen (1999)	USA	50,000–60,000 Plants (1984–1992)	Regression		
Isgut (2001)	Colombia	10.747 Plants (1981-1991)	Panel data		
Nassimbeni (2001)	Italy	165 Firms	Descriptive statistics; Logistic, OLS and Tobit regressions		
Bernard *et al.* (2003)	USA	200.000 Firms (1992)	Static Ricardian model of heterogeneous plants and trade; Simulation approach		
Bernard and Jensen (2004a)	USA	50,000-60,000 Plants (1983-1992)	Olley-Pakes (1996) production function		
Blalock and Gertler (2004)	Indonesia	20,018 Firms (1990-1996)	Descriptive statistics		
Alvarez and López (2005)	Chile	5,000 Plants (1990-1996)	Panel data		
Greenaway *et al.* (2005)	Sweden	3,570 Firms (1980-1997)	Descriptive statistics		
Ruane and Sutherland (2005)	Ireland	2,854 Firms (1991-1998)	Descriptive statistics; Random effects panel data regression		
Van Biesebroeck (2005)	9 sub-Saharan African countries	1,916 Firms (1992-1996)	Panel data; OLS		
Damijan and Kostevc (2006)	Slovenia	903-1,379 Firms (1994-2002)	Descriptive statistics		
Alvarez (2007)	Chile	More than 5,000 Plants (1990-1996)	Regression		

De Loecker (2007)	Slovenia	6,391 Firms (1994-2000)	OLS		
Fariñas and Martín-Marcos (2007)	Spain	1,403 Firms (1990-1999)	Descriptive statistics; Regression; OLS; Differences and System General Method of Moments		
Wilhelmsson and Kozlov (2007)	Russia	13,123-18,602 Firms (1996-2002)	Descriptive statistics; Pooled OLS; Fixed effects model		
Tsou *et al.* (2008)	Taiwan	5,923-9,639 Plants (1986-1996)	Descriptive statistics		
Kneller and Pisu (2010)	UK	343 Observations (2005)	Survey data; Factor analysis; Probit		
Yang and Mallick (2010)	China	2,340 Firms (2000-2002)	Descriptive statistics; Propensity Score Matching (kernel, radius, calliper, nearest neighbour)		
Vogel (2011)	Germany	13,845 (East)-51.780 (West) Observations (2003-2005)	Descriptive statistics; Panel data; Pooled regression; Fixed effects model		
Golikova *et al.* (2012)	Russia	499 Observations (2005-2009)	Descriptive statistics; Panel data		
Grazzi (2012)	Italy	60,000 Firms (1989-2004)	Non-parametric methods: Fligner-Policello test; Pooled OLS		
Haidar (2012)	India	33,510 Firms (1991-2004)	Descriptive statistics; OLS		
Monreal-Pérez *et al.* (2012)	Spain	1,767 Firms (2001-2008)	Panel data; Random Effects probit regression; 2SLS; Generalized Method of Moments		
Stöllinger *et al.* (2012)	Austria	6,000-6,300 Firms (2002-2006)	OLS		
Fu and Wu (2013)	China	879,000 Firms (2004)	Descriptive statistics		
Wagner (2002)	Germany	9,425 Firms (1978-1989)	Descriptive statistics; OLS; Panel data; Propensity Score Matching (nearest neighbour)	**N.S.**	No significant differences between exporters' and non-exporters' size.
Yasar and Rejesus (2005)	Turkey	5,805 Observations (1990-1996)	Propensity Score Matching		
Greenaway and Yu (2004)	UK	461 Firms (1989-1999)	Descriptive statistics; Panel data	**-**	Exporters are smaller than non-exporters.

Source: Own elaboration.

In what concerns the firms' size, there are no misleading findings. Actually, this is the characteristic that reunites the greatest unanimity, even being the one that has the wider range of measures. With this in mind, we posit the following hypothesis:

H.3.2. Exporters are larger than non-exporters.

1.3.3. Age

Regarding age, using their descriptive statistics, Aw and Hwang (1995), Fariñas and Martín-Marcos (2007) and Haidar (2012) show that, on average, age is higher for exporters than for firms selling only for the domestic market, for Taiwan (7.5 vs. 4.7 years), Spain (31 vs. 20 years) and India (28.82 vs. 24.90 years), respectively. Nassimbeni (2001) ends up with the same result for small Italian firms: 21.1 years vs. 16.2 years. On the contrary, this author proves that age does influence neither the export propensity nor the export intensity, so age is not decisive *per se* for a firm. Nassimbeni (2001: 259) stresses that being older can be an advantage for a firm, once it means a better knowledge and understanding of the market and its mechanisms, but he also states that "young firms are usually leaner and more receptive to changing perspectives". For China, Fu and Wu (2013) do not observe significant difference between exporters and non-exporters in terms of the companies' age for the whole sample, but dividing their sample for domestic and foreign firms, they verify that in both exporters are older than non-exporters (7.2 vs. 7.0 and 6.6 vs. 5.9 years respectively). Tsou *et al.* (2008) confirm as well that, in Taiwan, firms that export tend to be about three years older than non-exporters (respectively: 9.84 vs. 7.10 years in 1991; 11.59 vs. 9.15 years in 1996).

Related, Monreal-Pérez *et al.* (2012: 872) find that "age increases the firm's export propensity". So, the older the firm, the higher the likelihood of engaging in the export activity.

Still, Golikova *et al.* (2012) end up with an inconclusive result regarding age, since its coefficient is statistically insignificant.

Contrarily, Alvarez and López (2005: 1392) demonstrate that the probability to start exporting decreases with age, so that "exporters may be plants that started operations

with the international markets in mind". In the same vein, Greenaway *et al.* (2005) borne out this conclusion for Sweden, as they find that new exporters are more likely to be young companies. Yang and Mallick (2010) when analyzing their sample's statistics, conclude that exporters are younger firms than non-exporters (12.9 vs. 15.7 years, respectively).

Table 7 – Overview of studies focusing on the link between exporting and age

References	Country	Sample (Years)	Methodology	Effect	Results
Aw and Hwang (1995)	Taiwan	2,384 Firms (1986)	Descriptive statistics	+	Exporters are older than non-exporters.
Nassimbeni (2001)	Italy	165 Firms	Descriptive statistics; Logistic, OLS and Tobit regressions		
Fariñas and Martín-Marcos (2007)	Spain	1,403 Firms (1990-1999)	Descriptive statistics		
Tsou *et al.* (2008)	Taiwan	5,923-9,639 Plants (1986-1996)	Descriptive statistics		
Haidar (2012)	India	33,510 Firms (1991-2004)	Descriptive statistics; OLS		
Wagner (2012)	9 countries	(2006-2011)	Survey of 10 empirical studies		
Fu and Wu (2013)	China	879,000 Firms (2004)	Descriptive statistics		
Golikova *et al.* (2012)	Russia	499 Observations (2005-2009)	Descriptive statistics; Panel data; Multinomial logistic model	**N.S.**	Age is not significant in the study.
Alvarez and López (2005)	Chile	5,000 Plants (1990-1996)	Probit	-	Exporters are younger than non-exporters.
Greenaway *et al.* (2005)	Sweden	3,570 Firms (1980-1997)	Panel random effects estimation		
Yang and Mallick (2010)	China	2,340 Firms (2000-2002)	Descriptive statistics; Propensity Score Matching (kernel, radius, calliper, nearest neighbour)		

Source: Own elaboration.

Paying attention to the studies presented about the companies' age and summarized in table 7 presented above, it becomes clear that although there are just a few studies ascertaining this characteristic, the majority concludes that exporters tend to be the companies with the longest market experience. In fact, Wagner (2012: 261), in his survey of empirical studies, concludes that it seems to exist "a direct positive effect of exporting on survival", i.e., firms serving the external markets are more likely to survive than firms focused only on the domestic market, and this will be translated in the

company's longevity. Hence, based on the reviewed literature our hypothesis in this section is that

H.3.3. Exporters are older than non-exporters.

1.4. Differences in other variables

According to many authors, exporters can be distinguished from non-exporters in several aspects, beyond those above-mentioned in the text (both in performance measures and in characteristics). We stress that, the differences between exporters and non-exporters presented in this section will not be tested given the lack of available variables to perform the econometric test. Hence, we will not impose any hypotheses regarding these issues.

Alvarez and López (2005) and Alvarez (2007) refer that being part of a multinational can be decisive, because "either by increasing competition in domestic markets, transferring new technologies and information, or improving domestic knowledge about international markets, a larger concentration of foreign firms helps to improve other firms export performance" (Alvarez, 2007: 390). Hence, this factor, together with the firm's size and participation of foreign capital are the main factors explaining why some exporters become permanent and others are just sporadic. The author states that policies should focus on enhancing the firm's features, instead of the usual instruments that "are useful in reducing exporting entry costs, thus facilitating entry of new firms, but they may not be enough to sustain firm competitiveness in foreign markets" (Alvarez, 2007: 390). Related to this issue, other subject that deserved attention is the relationship between FDI and exports. Helpman *et al.* (2004) have addressed this issue and they define horizontal FDI as "an investment in a foreign production facility that is designed to serve customers in the foreign market" (Helpman *et al.*, 2004: 300). They prove that "firms tend to substitute FDI sales for exports when transport costs are larger and plant-level returns to scale are small" (Helpman *et al.*, 2004: 301). Similarly, Helpman *et al.* (2004: 315) conclude that "foreign markets are served more by exports relative to FDI sales when trade frictions are lower or

economies of scale are higher". Thus, they confirm the so called proximity-concentration trade-off, i.e., firms only invest in foreign markets if the benefits exceed the costs of internationalization needed to serve various countries.

Bernard and Jensen (1995) and Bernard and Wagner (1997) state that exporters are approximately 9.3 and 12.23% more capital-intensive than purely domestic-oriented firms, respectively for the US and Germany. There is a range of authors that agree with this idea, e.g., Blalock and Gertler (2004), Wilhelmsson and Kozlov (2007) and Yang and Mallick (2010), and some even measure this difference. For instance, Alvarez and López (2005) show that this difference is approximately 60% in Chile, Van Biesebroeck (2005) proves that it is 51% in sub-Saharan African countries, De Loecker (2007) demonstrate that it is about 36.55% in Slovenia and Tsou *et al.* (2008) find a difference ranging from 8.63% (in 1991) to 7.71% (in 1996). Similarly, Haidar (2012) observes an average difference (from 1991 to 2004) of 97%, favourable to internationalized firms. More, Haidar (2012) adds that the capital accumulation increases at a higher pace for exporters than for their exclusively domestic counterparts in the first three years of the export activity. Alvarez (2007) refers that while Chilean sporadic exporters are 47% more capital intensive than non-exporters, they are surpassed by 41% by permanent exporters. For UK, Greenaway and Yu (2004) agree that firms selling overseas have a greater capital intensity of 20.8% in the chemical industry (the one in which the study focuses) and of 24.7% in other manufactures. For Ireland, Ruane and Sutherland (2005) verify this, both with the average values of their sample and estimating with some controls (exporters are 12.1% more capital intensive than non-exporters). With another measure for the capital intensity, Fariñas and Martín-Marcos (2007) verify that firms serving the foreign market have a 71% (according to the sample's mean values) or 31% (when controlling for some companies' characteristics) higher capital per hour. Aw and Hwang (1995) prove that exporting firms have a superior capital-labour ratio by almost one and a half times, evaluated as value of net assets per worker, so they are more capital-intensive compared to non-exporters. Contrarily, Fu and Wu (2013), for China, find out that in the whole sample the capital-labour ratio is superior for exporters, but after separating the sample into two sub-groups, the conclusion is that, both for domestic and foreign-owned firms, non-exporters over perform exporters. Still, Luong

(2013) proves, with Chinese Automobile firms, that exporters and non-exporters cannot be distinguished regarding their capital-intensity. Aw and Hwang (1995) verify as well the existence of a greater capacity utilization (75.9% vs. 73.5%) for firms selling in foreign markets. Others studies report another varied set of differences. According to Fariñas and Martín-Marcos (2007) and Tsou *et al.* (2008) exporting firms also outperform non-exporters in terms of foreign equity participation, in Spain (24.3% vs. 2.8%) and Taiwan (5.3% vs. 0.5%), respectively. Moreover, Luong (2013) proves that Chinese automobile exporters outperform firms serving only their home market in terms of their output and inputs (both labour and capital, and so in investment and materials). However, there are no relevant differences between these two types of firms regarding their inputs' intensities (Luong, 2013: 469).

There is a range of subjects that is worth analyzing given their importance for enterprises performance, such as technology, investment and innovation.

Regarding this issues, various authors investigate and compare the performance of domestic and export-oriented companies. In their study for USA, Bernard and Jensen (1997) report that, on average, firms that export have a greater intensity in technology than non-exporters, once they have superior computer investment both per plant (4 times) and per employee (by 4%), as well as higher R&D expenditures (4.45% of total sales vs. 2.34%) and greater technologies in use per plant (3.91 vs. 2.20).

About another issue, Bernard and Jensen (1995) prove that, even after controlling for size, location and industry, exporters invest 4% more per employee than non-exporters. Bernard and Wagner (1997) find as well that exporters have a higher machinery investment per employee (of about 7.6%) than non-internationalized firms. Similarly, Isgut (2001) refers that after they start exporting, exporters increase their investment, particularly in human capital (instead of physical capital, which is heavier before the entry). "Three to five years after entry in the export market: their employment of white-collar workers, technicians and managers grows significantly faster than that of blue-collar workers, compared to non-exporters" (Isgut, 2001: 79). Van Biesebroeck (2005) and De Loecker (2007) report as well that exporters invest more than their merely domestic counterparts: the former (for nine African countries) by 48% and the latter (for Slovenia) by 37.49%. These findings may all point out to the

same idea: "(...) exporting is an activity undertaken by successful establishments" (Bernard and Jensen, 1995: 71). But after they initiating exporting they need more qualified workers to help facing the new challenges and higher level of competition found in international markets. This reason also justifies the Monreal-Pérez *et al.* (2012) conclusion that exporters are more innovative than non-exporters. In their study for Spain, the authors find that, when compared to non-exporters, exporters invest more in R&D activities and in both product and process innovations.

Measuring this innovation effect, Fariñas and Martín-Marcos (2007) prove (with sample's statistics) that in terms of the R&D activities pursued by the firms, exporters clearly overtake non-exporters: 53.7% vs. 14.4%). This picture still emerges after controlling for age, size, foreign ownership, industry and time, proving that exporting companies are more likely to perform innovation. Related, Fariñas and Martín-Marcos (2007) evaluate as well the R&D effort of Spanish manufacturing firms. Even in this variable, firms that sell overseas exhibit superior investment in R&D than those serving solely the domestic market (1.1% vs. 0.3%). Again, after taking into account some pertinent characteristics of the enterprises, this result holds. Summarily, Bernard and Wagner (1997: 136) state "successful plants and firms can and do take advantage of export markets to grow. However exporting *per se* does not provide a performance edge to firms, rather it appears that the ability to position oneself to compete and sell abroad is the source of superior characteristics at exporting plants". Providing an overview of the aforementioned subjects for small Italian firms, Nassimbeni (2001) stresses the areas that differentiate exporters from non-exporters. The author finds that firms that export surpass those that do not in terms of affiliation to consortia (16% vs. 3%), use of commercial intermediaries (25.91% vs. 7.99%), work in forecasts (i.e., make-to-stock: 16.86% vs. 2.76%), external service utilisation (52% vs. 41%) and the amount of future investments on innovation. More, exporting companies are more focused on product innovation, which is connected to their higher level of design technologies, once, as Nassimbeni (2001) explains, in order to bear all the challenges that internationalization brings (such as more demanding customers and more intense competition), firms must improve their product in terms of functionality, design and materials. On the contrary, non-exporters only exhibit a higher use of the subcontracting activity (56.75%) compared to exporters (25.44%). Still, there are some remaining aspects that do not

show any significant differences between these two types of companies. This is the case of technology (e.g., production, quality control, handling, storage, information and communication), which is a striking finding compared to other studies. Exporters and non-exporters also cannot be differentiated when it comes to human resource management, co-operative supplier and customer relationships, process innovation and the amount of investments in innovation in the past years. Besides this results, Nassimbeni (2001: 257) also proves that "the variables affecting the export propensity are the same ones that influence the export intensity of small manufacturing firms", these being firms' size, commercial intermediaries, consortia affiliation and product innovation. As the author points out, all of these variables ease the process of internationalization. It seems crucial for exporters (namely small ones) to establish some business connections with other firms, both through commercial intermediaries and affiliation to consortia. These vertical and horizontal relationships help exporters to adapt to the foreign environment and its demands. Another important finding is the primacy of product over process innovation. The former is generated internally by the firm through its skills, so "these resources cannot be acquired like machinery on the instrumental assets market: they can only be developed over time" (Nassimbeni, 2001: 260). Contrarily, process innovation can be replicated, once it is based on resources that can be purchased, thus it is not "a sustainable advantage in the long run" (Nassimbeni, 2001: 259).

On another subject, Bernard *et al.* (2006) investigate the importance of trade costs on the export activity. They reveal that "industries with relatively high reductions in tariff rates and transport costs exhibit relatively high gains in overall productivity growth (…) [due to] a reallocation of activity toward more productive plants within industries" (Bernard *et al.*, 2006: 934). Thus, the "low-productivity plants in industries with falling trade costs are more likely to die; that relatively high-productivity non-exporters are more likely to start exporting in response to falling trade costs; and that existing exporters increase their shipments abroad as trade costs fall." (Bernard *et al.*, 2006: 917).

On their study with U.S. firms, Bernard and Jensen (2004b) explore how some issues influence the probability of exporting, such as firm characteristics, spillovers and subsidies. They find that favourable exchange rates, changes in product mix or ownership by a multinational make a firm more likely to export. On the other hand, belonging to a multiplant establishment, the existence of geographic spillovers (namely the proximity to exporters within the same industry) or subsidies from the state government don't affect the probability of exporting. Besides, Bernard and Jensen (2004b) refer that past export experience influences actual exports experience, but the magnitude of this effect differs according to the estimation method. Estimating with plant effects, Bernard and Jensen, 2004b: 568) show that "having exported last year increases the export probability by 39%, whereas the benefit is reduced to 11.9% after two years", and without plant effects the magnitudes are 66 and 27% respectively. This finding reveal that sunk costs exist, however they reduce over time.

Similarly, Ruane and Sutherland (2005) for the effect of the export intensity on the exporters' performance. Indeed, the higher the share of exports over the company's total sales, the greater the firm's size, and wages, but the lower is the employment of skilled workers. So, Ruane and Sutherland (2005) show that neither the exports' destination nor the exports intensity have any effect on profitability or capital intensity.

In their study of 1998, Clerides *et al.* ascertained whether the exporting activity besides possibly bring positive effects for the exporting company, also generated externalities for the company's industry and region. The findings show that indeed there are some advantages, for instance, greater likelihood for non-exporters to become exporters in that industry. Clerides *et al.* (1998: 942) add: "production costs become lower in those regions of Colombia where export activity increases, even though the exporters themselves do not enjoy a special advantage", while for Morocco there are no conclusive results. Similarly, Melitz (2003) studied the effects for a country when it becomes more open to trade. He demonstrates that even incurring in significant costs in short-run to gain access to export market, in the long-run the country as a whole will enjoy an increase in its welfare. However, this is only possible because the more efficient and productive firms will increase their market share and profit over the least efficient and productive ones, which won't survive. So, the export market only selects

the most productive firms to entry, leaving the least productive selling only for their own country. In this respect, Melitz (2003: 1719) stresses that "trade-induced reallocations towards more efficient firms explain why trade may generate aggregate productivity gains without necessarily improving the productive efficiency of individual firms". Bernard and Jensen (2004a) agree with this idea, with the same finding for the US manufacturing firms. Furthermore, considering two distinct effects (the one across industries and the one within industries), Bernard and Jensen (2004a: 343) add that "half of this reallocation to more productive plants occurs within industries and the direction of the reallocation is towards exporting plants". Nevertheless, the contribution of the changes in output across industries is not negligible, once it accounts for 41.9% of the total productivity growth, i.e., of the overall TFP growth of 14.2%, 5.9% are due to the reallocation effect and 8.2% due to changes within plants.

Chapter 2: Empirical Investigation

2.1. Data

The empirical part of this dissertation will be based on the SABI (*Sistema de Análise de Balanços Ibéricos*[5] of Informa D&B) database focused on the Portuguese case. SABI is a Bureau Van Dijk's database, which provides data regarding Portuguese and Spanish companies over a decade. This dissertation only focuses on the Portuguese companies (the only ones for which data are available in FEP-UP's license). This database includes a very wide range of information, on a broad variety of issues, yet mainly focused on financial and accounting variables. For instance, SABI provides financial strength indicators, market research and stock data for listed companies. SABI allows us to get data about relevant variables for the present dissertation, such as: age, size (both the turnover, number of employees and total sales), sector, productivity, profitability, wages and sales (both for the domestic and the foreign market).

With this in mind, the final database used to conduct the estimations of the relevant hypotheses to be tested was collected on July 28th, 2014, using the version 61.00 of SABI, which contains data last updated on January 6th, 2014. The final database contains data for four distinct types of company:

- those exclusively exporters;
- those purely importers;
- those which are neither exporters nor importers (i.e., solely domestic firms);
- those which combine the exporting and the importing activity.

The data was collected for five years, from 2008 to 2012, given that this is the only period of time for which we can guarantee the existence of some pertinent variables in this research, such as all sales-related variables. Still, the criterion used to select the firms considered for the study was to exclude the micro enterprises, which as established by a recommendation of the European Commission (EC, 2003) and followed by other institutions (such as Eurostat[6] and OECD[7]), are firms with less than ten employees. The option to use the number of employees instead of the company's

[5] Analysis System of Iberian Balance Sheet.
[6] See Eurostat (2011).
[7] See OECD (2005).

turnover or balance sheet total (criteria also considered by those institutions) relates to the fact that total employment is a much more stable measure, contrasting with the volatility of the other measures. Therefore, the data extractions were done for each year individually imposing that only the firms with a minimum of ten employees would fit in the sample (yet, for 2008, this criterion could not be imposed due to SABI's software, so the extraction was made with all the firms, and then those companies with less than ten employees were eliminated). Subsequently, since we seek to follow the companies' evolution during the considered period, we excluded from the sample all those enterprises with data for only four or less years; in other words, we kept solely companies listed in all the five years (2008-2012).

Then, we focused our analysis merely on manufacturing firms, i.e., firms that belong to section C (subsectors 10 to 33) of Primary NACE Rev. 2 code. It was found that the presence of services would bias the research (e.g., presence of non-tradables, etc). Moreover, most of the empirical literature reviewed focused only on manufacturing, and this would allow to compare better our results with those emanating from the literature reviewed.

Additionally, we performed our estimations imposing a criterion to the variable **age**: firm's age equal to or below 28 years. This is justified by the fact that, as it will be explained in section 2.3.1.2, we are interested in ascertaining the existence of an inverted U-shaped relationship regarding age, and when estimating for all the firms the results were biased by older firms. So, our threshold of 28 years takes into account that most of the Portuguese internationalized firms appeared in the period after Portugal joined European Union in January 1st, 1986. As proved by INE (2007: 90-91), until this date, Portugal was not very engaged in international trade: in fact, in 1986, Portugal had an openness level (measured by the ratio of imports plus exports over GDP) of only 23.4%, clearly under the UE15's average value (approximately 55%). This was the key reason for choosing the abovementioned threshold.

More, after detecting a few cases of negative labour productivity – a technical impossibility - that could raise estimation issues, and extreme cases that could bias our

estimates, we decided to clean the dataset from these observations and so estimate the models only for enterprises with a gross value added per employee equal to or greater than zero. More, after finding a few outliers in labour productivity, we also decided to exclude these cases from our sample, since "(...) they can have an extreme effect on an analysis" (Acock, 2012: 264). So, another imposition: labour productivity equal to or greater than 50 (thousand Euros). To prove this situation, we present histograms of the total sample and of the sample conditioned with labour productivity ranging from 0 to 50 (inclusive), in figure A in appendix.

Hence, we end up with an unbalanced panel of firms for the period 2008 to 2012. Figure B, in appendix, sums-up of the data treatment process and the number of firms in each stage.

Under these circumstances, the final database (throughout the period 2008-2012) is composed by 4,536 companies that are exclusively exporters (16%), 9,977 importers/exporters (35%), 11,891 solely domestic firms (42%) and 2,210 only importers (8%), resulting in a total of 28,614 firms considered in this study. Since this dissertation's focus is on the differences distinguishing exporting from non-exporting firms, for empirical purposes we considered that exporters are both those firms only dedicated to exporting and those which are simultaneously exporters and importers and that the group of non-exporters encompasses only importers and companies that neither import nor export. For a clearer overview of each category and the number of companies contained within each one, table 8 is shown below. We emphasize the fact that both types of firms are almost – incidentally - equally represented in our sample.

This dissertation explores different issues not only regarding performance but also concerning firm's characteristics; hence the dataset contains an ample range of variables covering five years (2008-2012). The variables used in this study (which will be detailed in section 2.3.1.) are: region, primary NACE Rev. 2 code, gross value added, number of employees, labour productivity, gross margin, return on assets, return on sales, profit per employee, wages, yearly average cost per employee, sales (total, domestic market, Community market, Extra-Community market), service supply (total, domestic market, Community market, Extra-Community market), purchases (total,

domestic market, Community market, Extra-Community market), establishment date, turnover, EBIT, net income of the year, debt and income tax for the year.

Table 8 – Number of Firms (and percentage) in Each Category of Firm (Period 2008-2012)

Firms that only Export	4,536	(15.85%)	Exporters	14,513 (50.72%)	28,614
Firms that both Export and Import	9,977	(34.87%)			
Firms that neither Export nor Import	11,891	(41.56%)	Non-Exporters	14,101 (49.28%)	
Firms that only Import	2,210	(7.72%)			

Source: Own elaboration based on Stata 12.0.

2.2. Descriptive Analysis

Before proceeding with the estimations of the previously mentioned hypotheses for each performance measure or characteristic analyzed in this study, it is worth presenting a brief but enlightening descriptive analysis. In this section, we will provide five distinct measures: mean, median, maximum value, minimum value and standard deviation. The first four are measures of central tendency, while the latter one is a measure of the dispersion of the sample. The descriptive statistics for the most pertinent variables on study are presented in table 9.

Comparing their mean values, exporters display in general higher values for the characteristics under analysis, when compared with their purely domestic homologous. On average, exporting companies are 47% more productive (in terms of labour productivity), employ twice more employees and pay 24.6% higher wages per worker. The result for wages is understandable since internationalized companies dispend 3 times more for total wages and each employee costs them, on average, per year about 25.5% more than in non-exporters. More, besides being larger concerning total employment, this advantage of exporting companies is also patent in the value of total sales, where they surpass non-exporters by approximately five and a half times. Moreover, those companies that export sell about 3 times more even in the home market than their domestic-oriented homologous; this result is consistent with the one of Van Biesebroeck (2005). On average, exporters are also 2 years older than non-exporters. All these predictions are fully in line with the literature. We can see that regarding profitability, in contrast to the reviewed literature, a clear pattern emerges. On average,

exporters are more profitable than non-exporters, in terms of profit per employee (about 3 times), return on sales (7 times), profit margin (10 times) and return on assets (64 times). So, our descriptive results are consistent with our hypothesis of this performance measure. Additionally, according to the results, exporting companies show as well 6 times superior turnover and 10 times higher net income than purely domestic firms, and consequently, they pay 5 times more income taxes. Interestingly, exporters are 10% less indebted than their domestic counterparts.

2.3. Methodology

In order to pursue the empirical work, and after presenting the data collection methods and its descriptive analysis, this section intends to present the models used to test econometrically the hypotheses formulated throughout this dissertation. Additionally, this section will also provide an insightful explanation of all the variables included in the mentioned models, the type of model applied and the software used to perform the estimations. Finally, this segment will present the results of the econometric estimations.

2.3. 1 Variables

As referred in the beginning of the literature review, this dissertation attempts to ascertain whether exporters surpass their purely domestic counterparts regarding both certain selected performance measures and also a few firms' characteristics. So, in order to fulfil that goal, we needed to use an extensive array of variables to address all the matters depicted in the literature review. Thus, this section intends to present and explain the variables that will be used as proxies to estimate the hypotheses mentioned throughout chapter 1.

2.3. 1.1 Dependent Variables

In this dissertation the performance measures will be our dependent variables, as we are interested in testing the effect of exporting on the way that companies perform. Performance measures encompass both productivity and profitability measures.

Table 9 – Descriptive Statistics (2008-2012)

	Labour Productivity (th €)	Profit Margin (%)	Profit per Employee (th €)	Return on Assets (%)	Return on Sales (%)	Wages per Employee (th €)	Wages (th €)	Yearly average cost per employee (th €)
Exporters								
Mean	24.57632	1.287982	2.529846	2.412953	12.90967	12.44292	812.3906	15.7886
Median	20.8318	1.67	1.04907	1.8	3.5505	11.3612	362.049	14.3989
Minimum Value	0.13825	-685.98	-103.4286	-262.31	-396.2652	0.6281765	12.3632	0.84897
Maximum Value	99.92151	140.83	71.66924	121.94	92953.08	49.65015	84,236.57	65.74295
Standard Deviation	14.69279	12.41247	8.443948	9.871127	958.0571	4.944698	2,349.523	6.343872
Number of observations	14,513	14,509	14,513	14,513	9,414	14,495	14,495	14,513
Non-Exporters								
Mean	16.6951	0.1253012	0.9498192	0.0376945	1.774188	9.986194	273.5613	12.58061
Median	13.5528	1.48	0.45235	1.79	2.80885	8.68052	163.348	10.9115
Minimum Value	0.0144913	-380.86	-72.586	-984.72	-380.848	0.53508	5.3508	0.64974
Maximum Value	97.89074	55.54	60.6095	262.59	220.0894	70.90903	31,445.15	76.59143
Standard Deviation	10.43323	13.50377	4.924711	25.91002	12.65084	4.550084	682.6469	5.722263
Number of observations	14,101	14,095	14,101	14,097	6,520	14,085	14,085	14,101

Table 9 – Descriptive Statistics (2008-2012) (cont.)

	Number of Employees	Age (years)	Total Sales (th €)	Domestic Sales (th €)	Turnover (th €)	Indebtness (%)	Income Tax of the Financial Year (th €)	Net Income of the Financial Year (th €)
Exporters								
Mean	59.67677	16.71246	7,242.97	3,572.674	7,470.157	66.87453	64.27502	152.5554
Median	31	17	1,857.66	869.432	2,021.58	68.27	10.6641	23.0366
Minimum Value	10	0	0.036	0.014	4.088	2.76	-7,560.528	-48,757.55
Maximum Value	3,593	28	2,246,114	764,502.8	2,246,114	609.67	17,461.67	59,783.7
Standard Deviation	123.8128	6.931262	41,554.21	18,413.86	40,922.17	26.44795	444.5984	1,534.849
Number of observations	14,513	14,513	13,757	13,552	14,507	14,513	13,807	14,513
Non-Exporters								
Mean	25.52372	14.00071	1,309.225	1,287.927	1,372.463	73.93935	12.20845	15.51728
Median	18	13	507.147	493.16	562.609	70.465	3.139	5.99332
Minimum Value	10	0	0	0	6.91125	0	-1,378.17	-7,110.749
Maximum Value	1,592	28	379,428.6	379,428.6	411465.9	997.21	3,296.05	9,016.762
Standard Deviation	40.28628	7.02386	6,588.999	6,611.076	6,289.604	51.31208	57.2978	209.7305
Number of observations	14,101	14,101	9,947	9,843	14,095	14,080	12,187	14,101

Source: Own elaboration based on Stata 12.0.

Firstly, as a proxy for productivity we will use the labour productivity variable (**labprod**), computed as gross value added per employee, since this is the most used measure in the reviewed literature concerning productivity (e.g., Bernard and Jensen, 1995, 1999, 2004a; Bernard and Wagner, 1997; Clerides *et al.*, 1998; Castellani, 2002; Wagner, 2002; Bernard *et al.*, 2003; Girma *et al.*, 2004; Greenaway and Yu, 2004; Helpman *et al.*, 2004; Van Biesebroeck, 2005; Yasar and Rejesus, 2005; Damijan and Kostevc, 2006; Alvarez, 2007; De Loecker, 2007; Fariñas and Martín-Marcos, 2007; Wilhelmsson and Kozlov, 2007; ISGEP, 2008, Máñez-Castillejo *et al.*, 2010; Silva *et al.*, 2010a, 2010b; Vogel, 2011; García *et al.* 2012; Golikova *et al.*, 2012; Grazzi, 2012; Schröder and Sørensen, 2012; Fu and Wu, 2013; Luong, 2013).

Regarding profitability, SABI provides various proxies, which we will use to examine this issue: profit margin (**profmg**), profit per employee (**profemp**), and return on assets (**roa**). However, out of these three measures drawn directly from SABI, only the profit per employee variable is mentioned in one of the papers considered for this study: Girma *et al.* (2004). Despite this, the option of using the other variables as well is due to the fact that it gives us an opportunity to test more robustly and accurately the profitability hypotheses, given that this is the least unanimous issue on the literature, ending up with a wide variety of results. Even so, with the set of variables available in SABI, we were able to compute another profitability measure referred in the studied literature by Grazzi (2012): return on sales (**ros**). This variable was computed by dividing EBIT per total sales and total service supply (both measured in thousands of Euros).

Throughout the literature reviewed in the previous chapter, one idea became clear: exporting and non-exporting companies should not be discriminated solely based on their performance, but also in what regards to several characteristics that define the enterprise itself. For instance, we can point out the wages, the size and the age of the firms as features that make the difference when it comes to distinguishing between types of firm. So, in this dissertation we will use the firm characteristics as dependent variables in order to test the hypotheses related to wages, size and age.

To test the wage-related hypothesis we will use the variable wages per employee (**wages_emp**), which was computed as wages over number of employees for each company. This relative measure of wages was used by some studies, like Bernard and Jensen (1995), Bernard and Wagner (1997), Wagner (2002), Van Biesebroeck (2005), Fryges and Wagner (2010) and Vogel (2011).

In what concerns size, our dependent variable is total employment (**employ**), i.e., number of employees of each firm. This variable is widely used in the studies reviewed in the literature of this dissertation (Aw and Hwang, 1995; Bernard and Jensen, 1995, 1999; Wagner, 1995, 2002; Bernard and Wagner, 1997; Nassimbeni, 2001; Blalock and Gertler, 2004; Greenaway and Yu, 2004; Alvarez and López, 2005; Greenaway *et al.*, 2005; Ruane and Sutherland, 2005; Van Biesebroeck, 2005; Yasar and Rejesus, 2005; Damijan and Kostevc, 2006; Alvarez, 2007; De Loecker, 2007; Greenaway and Kneller, 2007; Fariñas and Martín-Marcos, 2007; Wilhelmsson and Kozlov, 2007; Tsou *et al.*, 2008; Vogel and Wagner, 2009; Kneller and Pisu, 2010; Yang and Mallick, 2010; Fryges and Wagner, 2010; Vogel, 2011; García *et al.*, 2012; Golikova *et al.*, 2012; Monreal-Pérez *et al.*, 2012 and Fu and Wu, 2013).

Finally, to test our final hypothesis we will use as the dependent variable **age**, computed as the difference, in years, between the year in question (e.g., 2008) and the year of establishment of the enterprise. This variable was already used in the studies of Aw and Hwang (1995), Nassimbeni (2001), Alvarez and López (2005), Fariñas and Martín-Marcos (2007), Tsou *et al.* (2008), Yang and Mallick (2010), Golikova *et al.* (2012) and Monreal-Pérez *et al.* (2012).

Table 10 sums up the most pertinent information about the dependent variables.

Table 10 – Synthesis of the Dependent Variables

Performance Measure	Dependent Variable	Description	Unit	Variable name on Stata
Productivity	Labour Productivity	Gross Value Added / Number of employees	Thousands euros	labprod
Profitability	Profit Margin	(P/L before tax / Operating revenue/turnover) * 100	Percentage	profmg
	Profit per Employee	P/L before tax / Number of employees	Thousands euros	profemp
	Return on Assets	(P/L before tax / Total assets) * 100	Percentage	roa
	Return on Sales	(Earnings before interest and taxes / Total sales) * 100	Percentage	ros
Wages	Wages per Employee	Wages / Number of employees	Thousands euros	wages_emp
Size	Employment	Number of employees	Number of employees	employ
Age	Company's Age	Number of years since the year of establishment	Years	age

Source: Own elaboration.

2.3. 1.2 Independent Variables

As it was clear throughout this dissertation, our main variable of interest is the export status, since we are interested in testing if being internationalized through exports impacts, and in what extent, in a range of performance measures and characteristics of the companies. Therefore, our main explanatory variable is the export status. The variable used in this study is based on a categorical variable drawn directly from SABI and concerning four different categories[8]. As explained in section 2.1, we created a new variable considering only two groups: exporters (aggregating firms that only export and firms that export and import) and non-exporters (i.e., firms that only import and firms that neither import nor import). Hence, the variable **exporter** is a dichotomous variable that assume the value 1 if the firm is an exporter and the value 0 otherwise (meaning if the company do not export).

[8] This variable reports the export status of the firm only for the last year the firm provided that information (thus it does not report changes in export status).

As explained, we also took into account variables regarding some characteristics of the firms.

Firstly, regarding wages, we use as measure the variable wages per employee. Since this variable is also one of our dependent variables, it will be used in all the regressions, except the one concerning wages.

Another feature considered in this study is size that will be proxied by total employment (**employ**), measured as the number of employees in each company. Since we are also interested in ascertaining the existence of an inverse U-shaped relationship between our dependent variables and size, we add as an independent variable the squared number of employees (**employ_sq**). Hence, **employ** is expected to have a positive sign and **employ_sq** to have a negative sign. Again, these variables will appear in all the regressions, except the one using employment as the dependent variable.

Additionally, we include an interaction term for exporter and size, computed as the multiplication between the dummy for export status (**exporter**) and total employment (**employ**). The resulting variable is called **expsize**.

Another characteristic considered is the age of the company (**age**). To present this variable, we computed by calculating the number of years since the company's establishment date (obtained from SABI) until each year considered (i.e., 2008 until 2012). To verify the existence of a quadratic relationship, we also include the variable **age_sq,** which is basically the squared age of the company. Once more, we expect the **age**'s coefficients to be positive and the **age_sq**'s to be negative. As in wages and employment, the age-related variables will not be included as predictors in the regression using **age** as the outcome variable.

Lastly, we also take into consideration the sector of the firm. We drew directly from SABI information about the four-digit Primary NACE code (Rev. 2) of each company. From this, we computed other only two digits to compute those variables we will use as predictors. Since, we are only using manufacturing firms, we created several dummies of each subsector of the section C (manufacturing) of the NACE rev. 2. So, the dummies are: **sector_10**, which takes the value 1 if the firm is engaged in activities of the subsector 10 (and 0 otherwise), **sector_11** that assumes the value 1 if the firm is

engaged in activities of the subsector 11 (and 0 Otherwise) and so on until subsector 33. We drop **sector_12** and **sector_19** due to lack of observations. It is a common approach to take as the reference category the one that has more observations (see table A1 in Appendix), which in our sample, is the **sector_25** dummy variable; hence, this will be our omitted category.

A brief sum-up of the independent variables is presented in table 11.

Table 11 – Synthesis of the Independent Variables

Characteristic	Independent Variable	Description	Unit	Variable name on Stata	Expected Sign
Export Status	Export Status (2 categories)	Binary variable: 1=exporter, 0=non-exporter	{0,1}	exporter	+
Wages	Wages	Wages	Thousands euros	wages	+
	Wages per employee	Wages / Number of employees	Thousands euros	wages_emp	+
	Yearly average cost per employee	Personnel expenses / Number of employees	Thousands euros	costemp	+
Size	Employment	Number of employees	Number of employees	employ	+
	Employment squared	(Number of employees)^2	-	employ_sq	-
	Total Sales	Total sales	Thousands euros	totsal	+
	Turnover	Turnover	Thousands euros	turnover	+
Exporter and Size	Interaction term between export status and size	Exporter * Number of employees	-	expsize	
Age	Company's Age	Number of years since the year of establishment	Years	age	+
	Company's Squared Age	(age)^2	-	age_sq	-
Sector	Manufacturing subsector dummies (i=10,...,33)	Binary variable: 1=firm is engaged in the subsector i, 0=otherwise	{0,1}	sector_i	

Source: Own elaboration.

2.3. 2 Econometric Model and Estimations

Despite more specific hypotheses, the central research question of this dissertation is to ascertain if there are differences discriminating between exporting and non-exporting companies in what concerns performance measures and some characteristics. Hence, we have to apply a model that allows us to compare these two types of firms. To fulfil this goal, we first considered a Pooled Ordinary Least Squares (i.e., Pooled OLS) model, as applied by Blalock and Gertler (2004), Wilhelmsson and Kozlov (2007), ISGEP (2008) and Grazzi (2012). The Pooled OLS is a methodology that imposes a restrictive condition: it cannot allow for change of status during the time period under analysis. This is confirmed by Park (2011: 11) since he states that "it assumes a constant intercept and slopes regardless of group and time period". This derives from the fact that, while panel data models account for heterogeneity, a Pooled OLS model does not takes it into consideration.[9] Hence, the enterprises considered in our sample are either permanent exporters (firms that have exported in all the five years in study) or permanent non-exporters (those companies that throughout the period, have never engaged in the exporting activity).

However, since our time period covers from 2008 to 2012, this type of estimation raises some problematic issues. During this period, Portugal suffered a severe economic and financial crisis that led the country to be under the strict austerity imposed by *Troika* (i.e., the team composed by members of the International Monetary Fund, the European Commission and the European Central Bank). Therefore, our estimates of the models considering the five years simultaneously with the Pooled OLS reflected this situation. The estimates were very atypical, not only in terms of their results, that were not in line with the expected predictions (and in some extent were not logical), but also because most of the models were not significant (and barely explicative). These circumstances, as well as the dataset inaccuracies already explained in section 2.1, led us to change our empirical approach. Consequently, we will test our hypothesis applying an OLS approach for each year separately. By doing this, our results significantly improve, and we can see what happened year by year: indeed, it appears

[9] The Pooled OLS model treats observations as a unique cross-section, while panel data models account for heterogeneity (so, they will treat each observation distinctly, by taking into consideration its specific effects). Moreover, panel data models remove the intercept from the regression, as they consider the variance in the periods under analysis for each observation. Hence, we chose Pooled OLS instead of panel data since it seems the more appropriate method considering our goals (in proving the differences between exporters and non-exporters by including a dummy variable for the export status in our regressions). Moreover, we will perform the OLS regressions for each year individually.

that, despite the Portuguese crisis began in 2008, it only had an impact from 2010 (the most problematic year of our results) onwards. This occurs, we think, because the exporting decisions are taken 1-2 years before, so the crisis is reflected in export behaviour with a 1-2 year lag.

The OLS approach is widely used in the literature that this work is based on in order to estimate the export premia for various performance measures and characteristics of the companies. For instance, it is used by Bernard and Jensen (1995) in their pioneering work regarding this theme. More, it was also used by Van Biesebroeck (2005), Wagner (2002), De Loecker (2007), Haidar (2012) and Stöllinger *et al.* (2012).

All the estimations were performed recurring to Stata (version 12.0), which is a statistical and econometrical software that strives for simplicity and clarity on one hand, but also for accuracy and precision on its outputs (as pointed out by Acock, 2012: 4). As we are estimating the hypotheses through an OLS model, we run the command *regress*.

A last necessary step before estimating is to test the strength of the relationship between the different variables in the study. The correlation matrix is presented in Table A2 (Appendix). We can see that there is a strong correlation between **labprod/wages_emp** and between **employ/expsize** (for this reason, **expsize** will not be used in the employment regressions). There is also a strong relationship, as expected, between **age/age_sq** and **employ/employ_sq**. We can also note a moderate correlation between **labprod/profmg**, but it is not pertinent since there is no regression in which both variables appear. The rest of the correlations are weak.

The first hypothesis to be tested is the one regarding the productivity performance of the two kinds of firms in study (i.e., H.1.1.), which speculates that exporters have a higher productivity level than those companies that sell purely on their domestic market. To test it, we will perform a regression of labour productivity (**labprod**) on a set of independent variables presented in section 2.3.1.2., among which is our variable of interest: exporter. Equation 2 differs from equation 1 by taking into account the range of manufacturing subsector dummies. Basing ourselves on the descriptive statistics and on the literature, we expect β_1 to be positive and statistically significant.

$$\mathbf{labprod_{it}} = \alpha + \beta_1 \mathbf{exporter_{it}} + \beta_2 \mathbf{wages\_emp_{it}} + \beta_3 \mathbf{employ_{it}} + \beta_4 \mathbf{age_{it}} + \beta_5 \mathbf{age\_sq_{it}} + \varepsilon_i \quad \textbf{(1)}$$

$$\mathbf{labprod_{it}} = \alpha + \beta_1 \mathbf{exporter_{it}} + \beta_2 \mathbf{wages\_emp_{it}} + \beta_3 \mathbf{employ_{it}} + \beta_4 \mathbf{age_{it}} + \beta_5 \mathbf{age\_sq_{it}} + \beta_6 \mathbf{sector\_10_{it}} + ... + \beta_{27} \mathbf{sector\_33_{it}} + \varepsilon_i \quad \textbf{(2)}$$

After analyzing productivity, we studied the relationship between exporting activity and profitability measures. To fulfil this goal, we estimated regressions of the following form:

$$\mathbf{profmg}_{it} = \alpha + \beta_1 \mathbf{exporter}_{it} + \beta_2 \mathbf{wages\_emp}_{it} + \beta_3 \mathbf{employ}_{it} + \beta_4 \mathbf{age}_{it} + \varepsilon_i \quad \textbf{(3)}$$

$$\mathbf{profmg}_{it} = \alpha + \beta_1 \mathbf{exporter}_{it} + \beta_2 \mathbf{wages\_emp}_{it} + \beta_3 \mathbf{employ}_{it} + \beta_4 \mathbf{employ\_sq}_{it} + \beta_5 \mathbf{age}_{it} + \beta_6 \mathbf{age\_sq}_{it} + \beta_7 \mathbf{sector\_10_{it}} + ... + \beta_{27} \mathbf{sector\_33_{it}} + \varepsilon_i \quad \textbf{(4)}$$

The option of selecting profit margin as our endogenous variable is due to the fact that it guarantees the best results. Our descriptive statistics' results, as well as the studies analyzed in this dissertation, are very ambiguous regarding profitability. Still, as postulated in our hypothesis, we expect exporters to be more profitable than non-exporters, i.e., we expect a positive sign of the coefficient associated with the exporter variable (β_1).

Besides testing the influence of the firms' export status on their performance, we will also test if being an exporter or a purely domestic company has any impact on some firms' characteristics, such as wages, size and age. Firstly, we regress wages per employee on exporter (the variable of interest), employment and employment square and age and age square (equation 5). Equation 6 uses the same variables, plus a range of sector dummies already presented. According to our findings in the descriptive analysis, as well as with the literature focusing on this issue, we expect exporter to exert a significant positive influence on the outcome variable, wages per employee.

$$\mathbf{wages\_emp_{it}} = \alpha + \beta_1 \mathbf{exporter}_{it} + \beta_2 \mathbf{employ}_{it} + \beta_3 \mathbf{employ\_sq}_{it} + \beta_4 \mathbf{age}_{it} + \beta_5 \mathbf{age\_sq}_{it} \beta_6 \mathbf{expsize_{it}} + \varepsilon_i \quad \textbf{(5)}$$

$$\mathbf{wages\_emp_{it}} = \alpha + \beta_1 \mathbf{exporter}_{it} + \beta_2 \mathbf{employ}_{it} + \beta_3 \mathbf{employ\_sq}_{it} + \beta_4 \mathbf{age}_{it} + \beta_5 \mathbf{age\_sq}_{it} + \beta_6 \mathbf{expsize} + \beta_7 \mathbf{sector\_10_{it}} + ... + \beta_{27} \mathbf{sector\_33_{it}} + \varepsilon_i \quad \mathbf{(6)}$$

Similarly, we ascertain the influence of the export status on total employment. Again, taking into account the descriptive statistics and the literature, exporter is expected to present a significant positive sign, meaning exporting firms are larger than non-exporters. So, we estimate the following regressions:

$$\mathbf{employ_{it}} = \alpha + \beta_1 \mathbf{exporter}_{it} + \beta_2 \mathbf{wages\_emp}_{it} + \beta_3 \mathbf{age}_{it} + \varepsilon_i \quad \mathbf{(7)}$$

$$\mathbf{employ_{it}} = \alpha + \beta_1 \mathbf{exporter}_{it} + \beta_2 \mathbf{wages\_emp}_{it} + \beta_3 \mathbf{age}_{it} + \beta_4 \mathbf{sector\_10_{it}} + ... + \beta_{24} \mathbf{sector\_33_{it}} + \varepsilon_i \quad \mathbf{(8)}$$

Finally, we also investigate if being an exporter impacts the companies' age. We estimate equation 9 with age as the dependent variable and export status, wages per employee, employment and employment square. In equation 10 we add a set of sector dummies as predictors. In line with the conclusions of our descriptive analysis and the reviewed studies, we expect exporter coefficient to be positive and significant.

$$\mathbf{age_{it}} = \alpha + \beta_1 \mathbf{exporter_{it}} + \beta_2 \mathbf{wages\_emp}_{it} + \beta_3 \mathbf{employ}_{it} + \beta_4 \mathbf{employ\_sq}_{it} + \beta_5 \mathbf{expsize} + \varepsilon_i \quad \mathbf{(9)}$$

$$\mathbf{age_{it}} = \alpha + \beta_1 \mathbf{exporter_{it}} + \beta_2 \mathbf{wages\_emp}_{it} + \beta_3 \mathbf{employ}_{it} + \beta_4 \mathbf{employ\_sq}_{it} + \beta_5 \text{expsize} + \beta_6 \mathbf{sector\_10_{it}} + ... + \beta_{26} \mathbf{sector\_33_{it}} + \varepsilon_i \quad \mathbf{(10)}$$

Besides all the afore-mentioned OLS estimates, we perform the same test through a Pooled OLS (only with the sector dummies). So, we use equations 2, 4, 6, 8 and 10.

2.3. 2.1 Testing the Self-Selection and the Learning-by-Exporting Hypotheses

Given that we tested the hypothesis of a possible existence of an exporter productivity premium, it would be interesting to ascertain the reason of that advantage

of internationalized companies over the solely domestic ones, i.e., testing for self-selection and/or learning-by-exporting. However, given to data constraints, testing for those phenomena will not be possible. Sabi only provides a categorical variable for the company's status with four categories: exporter, exporter/importer, importer and neither exporter nor importer. This was the variable used in all the previous tests; though, this variable is static: it only displays the status for the last year the firm reported. So, without any changing of the export status, it is therefore impossible to test for the existence of ex-ante or ex-post productivity effects for exporters.

Still, since both the selection and the learning hypotheses were already investigated for Portugal, we will present their results.

Silva *et al.* (2010a) presented a study were they tested for the first time for Portugal the premise that self-selection in export markets, both with a random effect probit model and an OLS model following the methodology of Bernard and Jensen (1999). It is important to emphasize that, as Bernard and Jensen (1999: 9) clearly state in their work, this methodology "is not a test for a causal relationship"; despite this, this method is widely used in studies, with Wagner (2007: 61) having called it "a standard approach". These authors have concluded in favour of the self-selection hypothesis, once they observed that new exporters become bigger (higher employment and sales), more productive (TFP and labour productivity), more capital intensive, invest more and have a lower labour cost per unit of sales in the pre-entry period. However, regarding growth rates, export entrants do not display significant *ex-ante* improvements labour productivity, TFP and unit labour cost (contrarily to employment, sales and capital intensity that get enhanced). Moreover, they also prove that self-selection is stronger for firms that are also engaged in imports, that export to more developed countries (and to multiple countries) and that work in low-technology sectors.

In the same year, Silva *et al.* (2010b) also tested the existence of learning-by-exporting for Portugal, for the first time as well. In their study they applied a propensity score matching method, a ground-breaking methodology introduced by Wagner (2002) in his study for Germany. According to the author, this method is more reliable than the alternatives once it accounts for the selection effect. Silva *et al.* (2010b) succeeded in proving the existence of *ex-post* productivity gains for new entrants when it comes to

productivity (value-added per employee and TFP), unit labour cost, capital-intensity, size (total employment and sales) and workers devoted to R&D. However, there is a decline in the growth rate profits and wages don't register any difference. in addition, they also find that the learning effects are stronger for firms that also import, that work in sectors where Portugal has comparative disadvantage, that do not belong to a multinational, that export to more developed countries, with lower wage levels, with high export intensity, and for bigger firms.

2.4. Results and Discussion

In the previous section, we presented all the equations, as well as the econometric methodology and the software program to which we recurred to conduct the estimations. In the present section, we provide and analyze the results of the estimation of equations (1) to (5) through OLS. The results are provided in tables 12 to 21.

Before explaining the actual results, it is important to stress that after estimating the models we tested for heteroskedasticity with the Breusch-Pagan test (Breusch and Pagan, 1979), which is one of the tests used to ascertain the existence of this problem (Oliveira *et al.*, 2011). According to the results, we reject the null hypothesis of homoskedasticity (for all regressions, but the ones with age as endogenous variable). With heteroskedasticity, the OLS estimates, whilst still centric and consistent, are no longer best linear unbiased estimates (BLUE) (Oliveira *et al.*, 2011: 261). As Breusch and Pagan (1974: 1287) refer, in the absence of homoskedasticity "the loss in efficiency in using ordinary least squares (OLS) may be substantial and, more importantly, the biases in estimated standard errors may lead to invalid inferences". So, in order to correct for this, we use the "heteroskedasticity-consistent covariance matrix estimator" (White, 1980: 821), i.e., we present our regressions with robust standard errors (except for age).

2.4.1. OLS Results

Labour Productivity

Firstly, as it can be seen in table 12, our main variable of interest (i.e., export status) is statistically significant in all years considered and presents the expected sign. The

same happens for wages per employee and age. Hence, the results are consistent with our hypothesis (H.1.1) that exporting companies are more productive, in terms of labour productivity, than the domestic-oriented ones: in 2009, being an exporter leads to an advantage of about 3,000€ and this is statistically significant at 1%. The relationship with wages per employee is coherent with our predictions: if wages per employee rise 1 (thousands euros), gross value added per worker increases approximately 2,000€ in all years of the period.

It is important to highlight that, as expected, we verify the existence of a inversely U-shaped relationship between labour productivity and age since the coefficient of **age** is positive, and the coefficient of **age_sq** is negative. This means that gross value added per employee increases with the age of the firm, until it hits its maximum. Thereafter, labour productivity starts a decreasing pathway.

Lastly, employment is not statistically significant.

Table 12 – OLS Results of Labour Productivity on Firm Characteristics (Period 2008-2012)

Independent Variables	Years				
	2008	2009	2010	2011	2012
exporter	2.5777*	2.517278*	2.393615*	2.34125*	2.845008*
	[0.2884811]	[0.3059488]	[0.2689917]	[0.2681706]	[0.3273844]
	(8.94)	(8.23)	(8.90)	(8.73)	(8.69)
wages_emp	2.027897*	2.042957*	1.953218*	1.933211*	1.875463*
	[0.0435409]	[0.046492]	[0.0471909]	[0.038912]	[0.0480386]
	(46.57)	(43.94)	(41.39)	(49.68)	(39.04)
employ	-0.0086207*	-0.0039538	-0.0032401	0.0008534	0.0080645
	[0.0030503]	[0.0043547]	[0.0036397]	[0.0048531]	[0.0058906]
	(-2.83)	(-0.91)	(-0.89)	(0.18)	(1.37)
age	0.272959*	0.1936407*	0.2439244*	0.2764621*	0.1700223***
	[0.0589903]	[0.0714773]	[0.0747316]	[0.0814395]	[0.0976542]
	(4.63)	(2.71)	(3.26)	(3.39)	(1.74)
age_sq	-0.0100216*	-0.0077966*	-0.0090304*	-0.0102*	-0.0064662**
	[0.002004]	[0.0023918]	[0.0023777]	[0.0025298]	[0.0028957]
	(-5.00)	(-3.26)	(-3.80)	(-4.03)	(-2.23)
expsize	0.013568*	0.0098092***	0.0140553*	0.0107468**	0.0039825
	[0.004224]	[0.0051396]	[0.0042044]	[0.0052643]	[0.0065134]
	(3.21)	(1.91)	(3.34)	(2.04)	(0.61)
Intercept	-3.401548*	-3.638259*	-4.059095*	-4.733282*	-4.249801*
	[0.444313]	[0.5609621]	[0.6290966]	[0.6234265]	[0.8032163]
	(-7.66)	(-6.49)	(-6.45)	(-7.59)	(-5.29)
R-squared	0.5849	0.5702	0.6000	0.6019	0.5806
F statistic	608.28	512.23	488.27	605.43	478.41
Observations	6,069	5,874	5,716	5,531	5,390
Robust	Yes	Yes	Yes	Yes	Yes

Source: Own elaboration based on Stata 12.0.

Note: The values in brackets are the standard errors and in curved parenthesis are the t-statistics. * means significance ate 1% level, ** denotes significance at 5% level and *** stands for significance at 10% level. The expression "robust" stands for correction for heteroskedasticity with robust standard errors.

We see in table 13 that even when accounting for sector dummies, the results remain almost the same. Still, it is worth noting that the quadratic relation between age and labour productivity is only significant in some years.

Table 13 – OLS Results of Labour Productivity on Firm Characteristics (Period 2008-2012)

Independent Variables	Years				
	2008	2009	2010	2011	2012
exporter	2.543013*	2.565043*	2.25747*	2.278479*	2.71218*
	[0.2883067]	[0.310089]	[0.2672776]	[0.270908]	[0.3209334]
	(8.82)	(8.27)	(8.45)	(8.41)	(8.45)
wages_emp	1.882621*	1.899515*	1.834961*	1.8392*	1.794693*
	[0.0487113]	[0.054525]	[0.0538183]	[0.0459517]	[0.0537576]
	(38.65)	(34.84)	(34.10)	(40.02)	(33.38)
employ	-0.0061589**	-0.0009461	-0.0008743	0.0036833	0.0094976***
	[0.0028883]	[0.0043086]	[0.0030754]	[0.0042307]	[0.0052322]
	(-2.13)	(-0.22)	(-0.28)	(0.87)	(1.82)
age	0.1844539*	0.085144	0.1455335***	0.1917358**	0.0806882
	[0.0580335]	[0.070141]	[0.0741834]	[0.0802869]	[0.0962494]
	(3.18)	(1.21)	(1.96)	(2.39)	(0.84)
age_sq	-0.0077255*	-0.0049737**	-0.0065695*	-0.0082067*	-0.0043822
	[0.0019804]	[0.0023387]	[0.0023515]	[0.0024883]	[0.0028488]
	(-3.90)	(-2.13)	(-2.79)	(-3.30)	(-1.54)
expsize	0.0116242*	0.0079007	0.0118025*	0.0075916	0.0016715
	[0.0041559]	[0.0051223]	[0.003795]	[0.0046985]	[0.0058608]
	(2.80)	(1.54)	(3.11)	(1.62)	(0.29)
Intercept	-0.7172857	-1.030256	-1.926709**	-3.148266*	-2.974462*
	[0.6739916]	[0.7773694]	[0.822961]	[0.8215043]	[1.007171]
	(-1.06)	(-1.33)	(-2.34)	(-3.83)	(-2.95)
Subsector Dummies	Yes	Yes	Yes	Yes	Yes
R-squared	0.6124	0.5982	0.6275	0.6249	0.6021
F statistic	242.50	213.97	216.05	218.63	181.95
Observations	6,069	5,874	5,716	5,531	5,390
Robust	Yes	Yes	Yes	Yes	Yes

Source: Own elaboration based on Stata 12.0.

Note: The values in brackets are the standard errors and in curved parenthesis are the t-statistics. * means significance ate 1% level, ** denotes significance at 5% level and *** stands for significance at 10% level. The expression "robust" stands for correction for heteroskedasticity with robust standard errors.

Profit Margin

Table 14 presents the results for the regression of profit margin on a series of independent variables (but no sector dummies). Exporter, the key-variable on our analysis, does not present a pattern as clear-cut as the previous performance measure. The coefficient is positive in all years except 2009. For instance, in 2008, the results imply that, *ceteris paribus*, being an exporter leads to a slight increase (0.5 p.p.) in profit margin and this is statistically significant. More, it appears that this effect was enhanced in 2011 and 2012 (0.8 and 1.7 percentage points). Still in 2009 and 2010 this

effect is statistically insignificant, and in 2009 it is even negative. This disappears when accounting for the manufacturing subsector that the enterprise belongs (table 16); though 2009 and 2010 remain non-significant. So, overall, we can conclude, for three out of five years, that profit margin is more favourable to exporters than to non-exporters (with everything else constant). This is in line with our hypothesis (H.2.): exporters are more profitable than non-exporters.

Table 14 – OLS Results of Profit Margin on Firm Characteristics (Period 2008-2012)

Independent Variables	Years				
	2008	2009	2010	2011	2012
exporter	0.5300551***	-0.0993087	0.2029436	0.8805155**	1.744309*
	[0.3022879]	[0.4220123]	[0.3062161]	[0.3431879]	[0.4992861]
	(1.75)	(-0.24)	(0.66)	(2.57)	(3.49)
wages_emp	0.2236524*	0.1935501*	0.2086977*	0.2097486*	0.301583*
	[0.0295578]	[0.0504189]	[0.0344712]	[0.0288136]	[0.0442416]
	(7.57)	(3.84)	(6.05)	(7.28)	(6.82)
employ	-0.005233**	-0.0060662***	-0.0054821***	0.0029518	0.0104283**
	[0.0025705]	[0.0036614]	[0.0031029]	[0.0049736]	[0.004965]
	(-2.04)	(-1.66)	(-1.77)	(0.59)	(2.10)
age	0.2553129**	-0.0946061	0.0540366	0.021161	-0.1854691
	[0.1036096]	[0.1042027]	[0.0834694]	[0.113713]	[0.1668822]
	(2.46)	(-0.91)	(0.65)	(0.19)	(-1.11)
age_sq	-0.0083058**	0.0023709	-0.0033493	-0.0024965	0.0031715
	[0.0033162]	[0.0035029]	[0.0026289]	[0.0035974]	[0.005032]
	(-2.50)	(0.68)	(-1.27)	(-0.69)	(0.63)
expsize	0.0025183	0.0035497	0.0071169**	-0.0007814	-0.007282
	[0.0027185]	[0.0037975]	[0.0033172]	[0.0051894]	[0.0052442]
	(0.93)	(0.93)	(2.15)	(-0.15)	(-1.39)
Intercept	-2.677581*	-0.3186948	-0.4418983	-2.164221*	-3.533432*
	[0.8878968]	[0.8666537]	[0.7250686]	[0.8183968]	[1.263359]
	(-3.02)	(-0.37)	(-0.61)	(-2.64)	(-2.80)
R-squared	0.0134	0.0040	0.0110	0.0131	0.0154
F statistic	12.25	3.58	10.09	13.82	15.95
Observations	6,069	5,873	5,713	5,529	5,386
Robust	Yes	Yes	Yes	Yes	Yes

Source: Own elaboration based on Stata 12.0.

Note: The values in brackets are the standard errors and in curved parenthesis are the t-statistics. * means significance ate 1% level, ** denotes significance at 5% level and *** stands for significance at 10% level. The expression "robust" stands for correction for heteroskedasticity with robust standard errors.

Contrarily, wages per employee is always statistically significant and positive, meaning that, keeping all other variables unchanged, when wages per employee increase 1 unit (thousands of Euros), profit margin rises approximately 0.2 percentage points (during all period considered). This might be related to our finding about gross value added per employee that when wages per worker increase, labour productivity increases as well. Employment is also significant in every year but 2011 and it is negative from 2008 to 2010, meaning that when employment increases, profit margin

decreases (which is understandable, since more employees imply more costs); yet it is positive in 2011 and 2012. Additionally, we attempt to ascertain the existence of an inverted U-shaped relationship between profit margin and age, but this is only proved in 2008. Lastly, the interaction term is mostly statistically insignificant.

Table 15 – OLS Results of Profit Margin on Firm Characteristics (Period 2008-2012)

Independent Variables	Years 2008	2009	2010	2011	2012
exporter	0.6485496***	0.2456969	0.1037054	0.8112503**	1.686285*
	[0.3497685]	[0.360142]	[0.3262715]	[0.359102]	[0.5260206]
	(1.85)	(0.68)	(0.32)	(2.26)	(3.21)
wages_emp	0.1065731*	0.0470003	0.1224614*	0.1474449*	0.2947039*
	[0.0357449]	[0.0622166]	[0.0380905]	[0.0328005]	[0.0551994]
	(2.98)	(0.76)	(3.22)	(4.50)	(5.34)
employ	-0.0049852	-0.0052719***	-0.0055898***	0.0034406	0.0100691***
	[0.0038146]	[0.0027215]	[0.0029031]	[0.0054154]	[0.0053315]
	(-1.31)	(-1.94)	(-1.93)	(0.64)	(1.89)
age	0.2710261**	-0.0888453	0.0731861	0.0712741	-0.0916867
	[0.10506]	[0.1002875]	[0.0843768]	[0.1156157]	[0.1638]
	(2.58)	(-0.89)	(0.87)	(0.62)	(-0.56)
age_sq	-0.0088189*	0.0020895	-0.003688	-0.0035612	0.0010241
	[0.0033785]	[0.0032993]	[0.0026417]	[0.0036517]	[0.0049676]
	(-2.61)	(0.63)	(-1.40)	(-0.98)	(0.21)
expsize	0.0037507	0.004538	0.006916**	-0.0015115	-0.0075989
	[0.0038895]	[0.0029026]	[0.003168]	[0.0055853]	[0.0055733]
	(0.96)	(1.56)	(2.18)	(-0.27)	(-1.36)
Intercept	0.6530844	3.500658*	1.26058***	-1.001097	-4.345852*
	[1.025922]	[1.032505]	[0.7560813]	[0.9703761]	[1.384656]
	(0.64)	(3.39)	(1.67)	(-1.03)	(-3.14)
Subsector Dummies	Yes	Yes	Yes	Yes	Yes
R-squared	0.0415	0.0335	0.0226	0.0316	0.0282
F statistic	10.23	7.54	6.46	7.31	9.15
Observations	6,069	5,873	5,713	5,529	5,386
Robust	Yes	Yes	Yes	Yes	Yes

Source: Own elaboration based on Stata 12.0.

Note: The values in brackets are the standard errors and in curved parenthesis are the t-statistics. * means significance ate 1% level, ** denotes significance at 5% level and *** stands for significance at 10% level. The expression "robust" stands for correction for heteroskedasticity with robust standard errors.

Wages per Employee

We will now focus on wages per employee. The results go in line with our predictions (H.3.1.): **exporter** (variable for export status) is statistically significant and positive. This means that being an exporter has a positive influence on the wages paid by companies to each employee (of about 2 thousand euros, *ceteris paribus*). We attempted to verify a possible quadratic relationship between wages per employee and both employment and age of the firm. The findings suggest that this relationship is

significant only in 2008 and 2009 for employment and in every year but 2009 for age. Still, in both cases, when verified, this is an inverse U-shaped relationship: wages per employee increase with the number of employees (and age) until the peak and then they decrease. Since we also proved the existence this type of relationship between labour productivity and age in certain years, this result is not surprising (given that wages tend to follow productivity).

Table 16 – OLS Results of Wages per Employee on Firm Characteristics (Period 2008-2012)

Independent Variables	Years				
	2008	2009	2010	2011	2012
exporter	2.224166*	2.183263*	2.165202*	2.296992*	2.414469*
	[0.1761695]	[0.1727908]	[0.1844222]	[0.1895111]	[0.1846848]
	(12.63)	(12.64)	(11.74)	(12.12)	(13.07)
employ	0.0133501*	0.0128138*	0.0125339*	0.0126117**	0.0120081*
	[0.0042837]	[0.0041854]	[0.0047512]	[0.0052951]	[0.0041049]
	(3.12)	(3.06)	(2.64)	(2.38)	(2.93)
employ_sq	-0.00000189*	-0.00000174*	-0.00000132	-0.00000139	-0.00000154
	[0.000000645]	[0.000000816]	[0.00000202]	[0.00000379]	[0.00000290]
	(-2.93)	(-2.13)	(-0.65)	(-0.37)	(-0.53)
age	0.1548317*	0.1009599*	0.1454828*	0.1578129*	0.168638*
	[0.0329332]	[0.0355022]	[0.0412581]	[0.0472223]	[0.0536156]
	(4.70)	(2.84)	(3.53)	(3.34)	(3.15)
age_sq	-0.0033282*	-0.0016704	-0.0031244**	-0.0037875*	-0.0040585*
	[0.0010898]	[0.0011609]	[0.0013182]	[0.0014562]	[0.0015614]
	(-3.05)	(-1.44)	(-2.37)	(-2.60)	(-2.60)
expsize	-0.0056937	-0.005383	-0.0060287	-0.0055437	-0.0048969
	[0.0045753]	[0.0044512]	[0.0047422]	[0.004755]	[0.00403]
	(-1.24)	(-1.21)	(-1.27)	(-1.17)	(-1.22)
Intercept	7.897089*	8.507891*	8.657786*	8.630092*	8.396924*
	[0.2404722]	[0.2586818]	[0.3063947]	[0.3717073]	[0.4354632]
	(32.84)	(32.89)	(28.26)	(23.22)	(19.28)
R-squared	0.0887	0.0830	0.0722	0.0800	0.0833
F statistic	90.49	82.90	71.52	74.24	75.27
Observations	6,069	5,874	5,716	5,531	5,390
Robust	Yes	Yes	Yes	Yes	Yes

Source: Own elaboration based on Stata 12.0.

Note: The values in brackets are the standard errors and in curved parenthesis are the t-statistics. * means significance ate 1% level, ** denotes significance at 5% level and *** stands for significance at 10% level. The expression "robust" stands for correction for heteroskedasticity with robust standard errors.

Once again it appears that including the range of dummies for each manufacturing subsector does not changes much the results.

Table 17 – OLS Results of Wages per Employee on Firm Characteristics (Period 2008-2012)

Independent Variables	Years				
	2008	2009	2010	2011	2012
exporter	1.474098*	1.445863*	1.373719*	1.48917*	1.617274*
	[0.1621041]	[0.153981]	[0.1769669]	[0.1898516]	[0.2008261]
	(9.09)	(9.39)	(7.76)	(7.84)	(8.05)
employ	0.0094615**	0.0086024**	0.0082831***	0.0084448	0.0081411***
	[0.0037845]	[0.0034466]	[0.0047843]	[0.0057474]	[0.0047191]
	(2.50)	(2.50)	(1.73)	(1.47)	(1.73)
employ_sq	-0.00000240*	-0.00000222*	-0.00000188	-0.00000176	-0.00000193
	[0.000000643]	[0.000000796]	[0.00000279]	[0.00000463]	[0.00000405]
	(-3.73)	(-2.78)	(-0.67)	(-0.38)	(-0.48)
age	0.0347034*	0.0245162*	0.0232951*	0.0144926***	0.0108715
	[0.00729]	[0.0070933]	[0.0075934]	[0.0080993]	[0.0086159]
	(4.76)	(3.46)	(3.07)	(1.79)	(1.26)
expsize	-0.0007966	-0.0005069	-0.0010151	-0.0008466	-0.0004728
	[0.0040621]	[0.0036863]	[0.0044676]	[0.0048721]	[0.0044592]
	(-0.20)	(-0.14)	(-0.23)	(-0.17)	(-0.11)
Intercept	11.50828*	11.85567*	12.51474*	12.78445*	12.8052*
	[0.2182279]	[0.213526]	[0.2461197]	[0.2513143]	[0.2648664]
	(52.74)	(55.52)	(50.85)	(50.87)	(48.35)
Subsector Dummies	Yes	Yes	Yes	Yes	Yes
R-squared	0.3555	0.3698	0.3624	0.3777	0.3587
F statistic	134.50	137.68	133.40	133.24	122.52
Observations	6,069	5,874	5,716	5,531	5,390
Robust	Yes	Yes	Yes	Yes	Yes

Source: Own elaboration based on Stata 12.0.

Note: The values in brackets are the standard errors and in curved parenthesis are the t-statistics. * means significance ate 1% level, ** denotes significance at 5% level and *** stands for significance at 10% level. The expression "robust" stands for correction for heteroskedasticity with robust standard errors.

Employment

Table 18 – OLS Results of Total Employment on Firm Characteristics (Period 2008-2012)

Independent Variables	Years				
	2008	2009	2010	2011	2012
exporter	28.69868*	27.17353*	27.40429*	28.41509*	30.18968*
	[2.060675]	[1.99572]	[1.952343]	[1.99029]	[2.127926]
	(13.93)	(13.62)	(14.04)	(14.28)	(14.19)
wages_emp	2.060771*	2.013725*	1.70742*	1.907925*	1.958293*
	[0.416547]	[0.4393082]	[0.4019364]	[0.4388388]	[0.4562239]
	(4.95)	(4.58)	(4.25)	(4.35)	(4.29)
age	0.4746243*	0.4059086*	0.3996236*	0.3197535**	0.3020754***
	[0.1257857]	[0.1233682]	[0.1229195]	[0.1473915]	[0.1694297]
	(3.77)	(3.29)	(3.25)	(2.17)	(1.78)
Intercept	0.1755633	0.2973808	2.574829	1.386711	0.5421976
	[3.576725]	[4.079686]	[4.316917]	[4.786737]	[5.139603]
	(0.05)	(0.07)	(0.60)	(0.29)	(0.11)
R-squared	0.0439	0.0427	0.0419	0.0465	0.0436
F statistic	75.80	69.79	69.46	73.62	69.55
Observations	6,069	5,874	5,716	5,531	5,390
Robust	Yes	Yes	Yes	Yes	Yes

Source: Own elaboration based on Stata 12.0.

Note: The values in brackets are the standard errors and in curved parenthesis are the t-statistics. * means significance ate 1% level, ** denotes significance at 5% level and *** stands for significance at 10% level. The expression "robust" stands for correction for heteroskedasticity with robust standard errors.

Tables 18 and 19 provide the results of the regressions of total employment on some firm characteristics, without and with sector dummies, respectively. The results are similar. As expected, *ceteris paribus*, exporters are larger than non-exporters in terms of employment (as stated in hypothesis H.3.2.). Wages per employee also present a positive effect in the total number of workers of a company. More, it appears that as the company grows old, it hires more employees. Since we verify, for some years, the existence a negative quadratic relation between labour productivity and age, these findings could be on the increasing part of the function. Still, we cannot prove the same type of relation between age and employment.

Table 19 – OLS Results of Total Employment on Firm Characteristics (Period 2008-2012)

Independent Variables	Years 2008	2009	2010	2011	2012
exporter	27.21639*	26.25182*	26.94511*	27.65727*	28.84294*
	[1.970722]	[1.920726]	[1.93463]	[2.05965]	[2.191019]
	(13.81)	(13.67)	(13.93)	(13.43)	(13.16)
wages_emp	2.552675*	2.419031*	2.021798*	2.431136*	2.394468*
	[0.4657256]	[0.5074348]	[0.4370201]	[0.5011213]	[0.5081069]
	(5.48)	(4.77)	(4.63)	(4.85)	(4.71)
age	0.6006111*	0.5397289*	0.5648823*	0.4904902*	0.4883948*
	[0.1291706]	[0.1307082]	[0.1367115]	[0.160704]	[0.1858964]
	(4.65)	(4.13)	(4.13)	(3.05)	(2.63)
Intercept	-22.17949*	-19.85115*	-16.4433**	-20.83585*	-22.51879*
	[6.12081]	[6.85505]	[6.814788]	[7.933513]	[8.082196]
	(-3.62)	(-2.90)	(-2.41)	(-2.63)	(-2.79)
Subsector Dummies	Yes	Yes	Yes	Yes	Yes
R-squared	0.0919	0.0908	0.0901	0.0948	0.0955
F statistic	15.79	14.86	14.09	14.49	13.51
Observations	6,069	5,874	5,716	5,531	5,390
Robust	Yes	Yes	Yes	Yes	Yes

Source: Own elaboration based on Stata 12.0.

Note: The values in brackets are the standard errors and in curved parenthesis are the t-statistics. * means significance ate 1% level, ** denotes significance at 5% level and *** stands for significance at 10% level. The expression "robust" stands for correction for heteroskedasticity with robust standard errors.

Age

The last characteristic we studied is age and its results are in tables 20 and 21. Just like in all other regressions, including sector dummies does not have a considerable impact. The results for our main variable, export status are coincident with our expectations (H.3.3.): exporters are about two years older than purely domestic firms (keeping all other variables unchanged) and this is significant in all years. More, it seems that the older the firm, higher the wages it pays to its employees.

Table 20 – OLS Results of Age on Firm Characteristics (Period 2008-2012)

Independent Variables	Years				
	2008	2009	2010	2011	2012
exporter	2.397917*	2.322856*	2.18945*	2.165606*	2.19248*
	[0.227098]	[0.2233804]	[0.2187851]	[0.2175053]	[0.2162228]
	(10.56)	(10.40)	(10.01)	(9.96)	(10.14)
wages_emp	0.1460865*	0.1232003*	0.1028036*	0.0763725*	0.0638645*
	[0.0199904]	[0.020127]	[0.01888]	[0.0189378]	[0.0184612]
	(7.31)	(6.12)	(5.45)	(4.03)	(3.46)
employ	0.0063677***	0.0049293	0.0034743	0.0029162	-0.0005823
	[0.0032999]	[0.0032763]	[0.0032369]	[0.0033175]	[0.0034195]
	(1.93)	(1.50)	(1.07)	(0.88)	(-0.17)
employ_sq	-0.00000308*	-0.00000276*	-0.00000209**	-0.00000142***	-0.000000818
	[0.000000810]	[0.000000881]	[0.000000872]	[0.000000848]	[0.000000745]
	(-3.80)	(-3.13)	(-2.39)	(-1.67)	(-1.10)
expsize	0.0019492	0.0023861	0.0025993	0.0011942	0.0036058
	[0.003439]	[0.0034026]	[0.0033915]	[0.0034883]	[0.0036189]
	(0.57)	(0.70)	(0.77)	(0.34)	(1.00)
Intercept	11.0501*	11.99573*	12.87552*	13.87543*	14.87145*
	[0.2422132]	[0.2463641]	[0.2418687]	[0.2420582]	[0.2365642]
	(45.62)	(48.69)	(53.23)	(57.32)	(62.86)
R-squared	0.0541	0.0486	0.0438	0.0387	0.0403
F statistic	69.36	59.95	52.26	44.51	45.24
Observations	6,069	5,874	5,716	5,531	5,390
Robust	No	No	No	No	No

Source: Own elaboration based on Stata 12.0.

Note: The values in brackets are the standard errors and in curved parenthesis are the t-statistics. * means significance ate 1% level, ** denotes significance at 5% level and *** stands for significance at 10% level. The expression "robust" stands for correction for heteroskedasticity with robust standard errors.

We attempted to determine if the relationship between employment and age resembles an inverted U. The results only confirm this idea for 2008 (without sector dummies, or 2008 and 2009 with the dummies). We emphasize that 2008 is perhaps the only year not affected by the atypical character of Portuguese recent crisis. The economic-financial crisis affects both the performance of exporters and non-exporters. The Portuguese crisis caused a serious shrink of the domestic demand, and so the paralysis of the domestic market; besides this situation impacts both groups of firms, it is mainly a concern for purely domestic firms. Additionally, Portuguese exporters are also affected by the lack of economic growth in the external market given that Portugal's main trade partners are European countries. As it can be seen in INE (2014: 67), 71.2% of Portugal's FOB (Free on Board) exports go to European Union's countries.

Table 21 – OLS Results of Age on Firm Characteristics (Period 2008-2012)

Independent Variables	Years 2008	2009	2010	2011	2012
exporter	2.514783*	2.398526*	2.234904*	2.23424*	2.23981*
	[0.2305169]	[0.2271204]	[0.2225038]	[0.2207831]	[0.2192923]
	(10.91)	(10.56)	(10.04)	(10.12)	(10.21)
wages_emp	0.1176415*	0.0836027*	0.067794*	0.0415643***	0.0278908
	[0.0236383]	[0.0241252]	[0.0225997]	[0.0228201]	[0.0218684]
	(4.98)	(3.47)	(3.00)	(1.82)	(1.28)
employ	0.0077875**	0.006338***	0.0047835	0.0044664	0.0007127
	[0.0032928]	[0.0032714]	[0.0032248]	[0.0033038]	[0.003404]
	(2.37)	(1.94)	(1.48)	(1.35)	(0.21)
employ_sq	-0.00000353*	-0.00000324*	-0.00000260*	-0.00000189**	-0.00000127***
	[0.000000809]	[0.000000880]	[0.000000869]	[0.000000844]	[0.000000742]
	(-4.36)	(-3.69)	(-2.99)	(-2.24)	(-1.71)
expsize	0.0022471	0.002805	0.0033518	0.0014865	0.0040613
	[0.0034394]	[0.0034045]	[0.0033864]	[0.003478]	[0.0036047]
	(0.65)	(0.82)	(0.99)	(0.43)	(1.13)
Intercept	11.28077*	12.37468*	13.08329*	13.96713*	14.9324*
	[0.393328]	[0.3980569]	[0.3922376]	[0.3953694]	[0.3843955]
	(28.68)	(31.09)	(33.36)	(35.33)	(38.85)
Subsector Dummies	Yes	Yes	Yes	Yes	Yes
R-squared	0.0737	0.0683	0.0660	0.0628	0.0645
F statistic	18.48	16.48	15.47	14.18	14.22
Observations	6,069	5,874	5,716	5,531	5,390
Robust	No	No	No	No	No

Source: Own elaboration based on Stata 12.0.

Note: The values in brackets are the standard errors and in curved parenthesis are the t-statistics. * means significance ate 1% level, ** denotes significance at 5% level and *** stands for significance at 10% level. The expression "robust" stands for correction for heteroskedasticity with robust standard errors.

2.4.2. Pooled OLS Results

After running the regression through an OLS year-by-year (cross-section), we will also apply a Pooled OLS model to our sample. Initially, we have excluded this possibility. However, after cleaning our dataset as explained in section 2.1, we decided to verify if that cleaning would change the results. Table 22 below shows the results for these estimations.

In labour productivity, as well as in the OLS model, our key-variable is significant and positive; more its coefficient is very similar in both models. Also, wages per employee continue to have a positive influence in labour productivity. We saw that he OLS results were not conclusive regarding employment; the pooled OLS coefficient reveal that employment has a positive impact on gross value added per worker, though it is insignificant. As in the OLS, we confirm that the relationship between labour productivity and age resembles an inverted U.

While the OLS results for profit margin were not completely unanimous about the influence of the export status, the Pooled OLS shows that exporters are more profitable than non-exporters regarding profit margin (and this is statistically significant). Wages per employee continue to present a positive significant coefficient, and employment is insignificant. In this model we cannot test for a possible quadratic relationship for age (as done in OLS) since the squared age is not significant (therefore, not reported). Still, the results for age show that this variable has a negative (significant) influence on profit margin.

Table 22 – Pooled OLS Results (Period 2008-2012)

Independent Variables	Dependent Variables				
	labprod	profmg	wages_emp	employ	age
exporter	2.559849*	0.7436468*	1.454869*	27.50622*	2.281067*
	[0.1307802]	[0.171678]	[0.0658297]	[0.8947172]	[0.1011642]
	(19.57)	(4.33)	(22.10)	(30.74)	(22.55)
wages_emp	1.835599*	0.1383988*		2.341368*	0.0862795*
	[0.0227794]	[0.0204455]		[0.2133452]	[0.0103558]
	(80.58)	(6.77)		(10.97)	(8.33)
employ	0.0006873	-0.000871	0.0086258*		0.004755*
	[0.0017008]	[0.0017622]	[0.0012403]		[0.0014849]
	(0.40)	(-0.49)	(6.95)		(3.20)
employ_sq			-0.00000207*		-0.00000247*
			[0.000000345]		[0.000000372]
			(-6.00)		(-6.64)
age	0.0826972*	-0.0408984*	0.0691375*	0.5208049*	
	[0.031599]	[0.001825]	[0.0147853]	[0.0646233]	
	(2.62)	(-3.95)	(4.68)	(8.06)	
age_sq	-0.0050661*		-0.0013489*		
	[0.0010163]		[0.0004681]		
	(-4.99)		(-2.88)		
expsize	0.0083884*	0.0015229	-0.000732		0.0027292***
	[0.0020609]	[0.001825]	[0.0013208]		[0.0015587]
	(4.07)	(0.83)	-0.55		(1.75)
Intercept	-1.27038*	0.7566562**	11.93313*	-19.88117*	12.84898*
	[0.3466472]	[0.3644472]	[0.1313629]	[3.101054]	[0.177002]
	(-3.66)	(2.08)	90.84	(-6.41)	(72.59)
Subsector Dummies	Yes	Yes	Yes	Yes	Yes
R-squared	0.6064	0.0227	0.3620	0.0651	0.0651
F statistic	1,036.63	26.37	631.94	76.42	76.42
Observations	28,580	28,570	28,580	28,580	28,580
Robust	Yes	Yes	Yes	Yes	No

Source: Own elaboration based on Stata 12.0.

Note: The values in brackets are the standard errors and in curved parenthesis are the t-statistics. * means significance ate 1% level, ** denotes significance at 5% level and *** stands for significance at 10% level. The expression "robust" stands for correction for heteroskedasticity with robust standard errors.

Next, for wages per employee, these estimates still confirm that exporters surpass non-internationalized firms. Additionally we confirm that the relationship between wages per employee and both employment has an inverted U shape. All these findings are statistically significant.

Concerning employment, the pooled OLS results are fully consistent with those from OLS: coefficients for export status, wages per employee and age are all positive and statistically significant.

Lastly, exporters seem to be older than their solely domestic counterparts according to Pooled OLS. There is also evidence for a positive relationship between age and wages per worker and a quadratic relation between age and employment.

In a nutshell, focusing only on the export status variable, according to the Pooled OLS model, being an exporter leads to an advantage over domestic-oriented firms in all the performance measures (productivity and profitability) and firm characteristics (wages, size and age) considered.

2.4.3. Discussion

Considering both the results of OLS and Pooled OLS models, we can that they are unanimous in giving support to four of our five hypotheses. It is unequivocal that firms engaged in exports perform better in terms of productivity and also surpass their purely domestic counterpart on wages paid per person, number of employees hired and longevity. This converges to both or findings in the preliminary descriptive analysis and the conclusions of the majority of the reviewed studies. Regarding profitability, as in the literature, some degree of uncertainty remains: In OLS, besides the export status coefficient being mostly positive and significant, it also displays a negative sign. Then in the Pooled OLS, export status shows a significant and positive influence (of about 0.7 percentage points).

One of the most unanimous ideas surging from the literature is the existence of an exporter productivity premium (Wagner, 2007). It is understandable since are competing not only with domestic non-exporters in their home market, but also with firms that supply their exports' destination markets. For instance, Bernard *et al.* (2003: 1287) prove "(...) the importance of export costs in segmenting markets, and of efficiency differences across producers in generating heterogeneity in market power,

measured productivity, and the ability to overcome geographic barriers". Our results, both from the preliminary descriptive statistics, as from the OLS and Pooled OLS estimations give solid support to our hypothesis that exporters surpass non-exporters regarding their labour productivity. This result was proved with similar methodologies by De Loecker (2007) for Slovenia and ISGEP (2008) for 14 different countries. As Helpman *et al.* (2004) shows, even not being the top players of the market, exporters are among the most efficient companies (being surpassed only by firms engaged in FDI).

It is patent on the results a clear statistically significant and positive (as expected) relationship between labour productivity and wages per employee. This is fully in line with our predictions since these two variables tend to walk side by side. More, this might be related with a fact pointed out by several studies: exporting companies employ more high-qualified workers than non-exporters (e.g., Bernard and Jensen, 1995, 1999; Bernard and Wagner, 1997; Ruane and Sutherland, 2005, Fariñas and Martín-Marcos, 2007 and Tsou *et al.*, 2008). When Bernard and Jensen (1997: 4) tried to explain the higher demand for skilled workforce and the wage differentials between types of employees, they state: "In attempting to pinpoint the sectors and plant characteristics associated with these movements, we find that export status of the plant is a key variable both at the industry and plant level". Unfortunately, we do not test for the hypothesis of higher qualified employees at exporters due to lack of variables.

With this, it also did not come as a surprise that firms engaged in exports tend to be larger, since they expanded their area of operation. Our hypothesis predicted this in line with the considered literature, our descriptive analysis results corroborated this and our estimates solidified the conclusions. Hence, our findings for employment are in line with most studies focusing on this size measure: For instance, Aw and Hwang (1995), Bernard and Jensen (1995), Bernard and Wagner (1997), Isgut (2001), Blalock and Gertler (2004), Ruane and Sutherland (2005), Fariñas and Martín-Marcos (2007) and Golikova *et al.* (2012). Aw and Hwang (1995: 330) explain that "(...) bigger firms that are not already exporting are more likely to do so if they face downward-sloping domestic demand schedules, since they have the necessary resources to incur the extra costs of diversifying into foreign markets". This pinpoints the fact that perhaps this advantage already exists before firms start selling abroad, justifying why exporters are larger.

The results for age are the expected ones: exporters tend to be older firms. This is understandable since: "(...) age appears to correlate with structural solidity and acquired experience in the sector, factors which are clearly important when a firm plans to expand abroad" (Nassimbeni, 2002: 256). Furthermore, it might me related to the finding of Bernard and Wagner (1997) and Bernard and Jensen (1999) that exporters have higher survival likelihood than firms serving only their home market.

Our results from profit margin do not refute our hypothesis. Albeit not presenting a pattern as solid as that of the other measures, still emerges that exporters are in general more profitable regarding their profit margin. This is coherent with our descriptive analysis and, at some extent, with the literature reviewed. Profitability does not reunite consensus among the authors; yet Melitz (2003), Ruane and Sutherland (2005), Egger and Kreickmeier (2010), Fryges and Wagner (2010) and Kneller and Pisu (2010) show that exporters are more profitable than purely domestic companies (but none with profit margin).

Recalling: our main research question was whether or not exporters substantially differ from non-exporters. In short, basing ourselves on our econometric analysis, the answer is yes: being an exporter *per se* impacts the existence of several premia. This is compatible with findings of several authors, particularly Bernard and Jensen (1995: 88) on their pioneering study of this issue: "The typical exporting plant is much larger, pays higher wages, and is (...) more productive than its nonexporting counterpart".

Conclusions and Policy Implications

The ultimate goal of this dissertation was to answer what we consider a very relevant research question: Are there significant performance differences between exporters and non-exporters in Portugal? Based on this goal, we started by presenting the findings of extant literature on this theme, and some clear conclusions arose. Firstly, it appears to be a stylized fact that firms engaged in exports have a greater productivity than non-exporters. Similarly, it also emerges as an almost unanimous finding, that exporters pay higher wages to their employees than their purely domestic counterparts. Furthermore, the results point to the fact that exporting companies are bigger than non-exporting ones, especially when it comes to total employment (but also sales and turnover). More, exporters also appear to be older firms than non-exporters. Still, regarding profitability, although mostly in line with our expectations, is not as evident as the other results.

This led us to explore and ascertain empirically if, in the case of Portugal, there are exporter premia regarding all these measures of performance and characteristics of the enterprises, like Bernard and Jensen did in their pioneering study of these matters in 1995. To fulfil this goal we ran several OLS and Pooled OLS regressions for productivity, profitability, wages, size and age. The results are clear: According to our results, it appears that being an exporter has a positive impact in all these measures. Profitability, while not presenting the most unequivocal results, still confirms our hypotheses and lends some support to that theory that states that, even employing more workers, and paying higher wages per employee, as well as bearing a higher amount of trade costs, exporters can be more profitable than those companies only serving their home market. Even so, it seems that exporters can play an important part in the economic outlook.

Considering the results, some important policy implications can be drawn. Since exporters appear to display better results regarding a series of decisive firm-related variables, policymakers should focus on policies to promote exports in Portugal. Institutions like AICEP[10] - *Agência para o Investimento e Comércio Externo de Portugal* (Agency for Investment and Foreign Trade of Portugal), that promote initiatives like "*Portugal Global*" (Global Portugal), by creating *lojas de exportação*

[10] All the information about AICEP is available on: http://www.portugalglobal.pt/PT/Paginas/Index.aspx .

(export stores), *rede comercial externa* (overseas commercial network) and providing various support (e.g., financial support for internationalization, consultancy, client managers) should be developed and endorsed. This is even more important if we take into consideration that Portugal has not fully recovered from its recent economic and financial crisis that led domestic demand to shrink considerably. So, internationalization, notably through exports, can be decisive in making or breaking a firm.

There are plenty of gaps to be fulfilled by future research, especially for Portugal. For instance, future studies on this theme should address this question regarding other pertinent measures as capital, investment, technology and innovation that as described in our literature review also appear to play an important part in explaining the differences separating exporters from non-exporters. Moreover, Silva *et al.* (2010a, 2010b) state that being a two-way trader enhances the effects of self-selection and learning-by-exporting. So, it would be interesting to make a similar study to that made in this dissertation by considering four groups: firms that only import, firms that only export, firms that both import and export and firms that neither import nor export. Similarly, this same study could be applied as well in a comparison of firms internationalized through Foreign Domestic Investment and through exports and those not internationalized. Furthermore, to ascertain if being part of a multinational impacts the difference between exporters and non-exports.

Bibliographic References

Acock, A. C. (2012), *A Gentle Introduction to Stata*, Revised Third Edition, Texas: Stata Press.

Alvarez, R. (2007), "Explaining Export Success: Firm Characteristics and Spillover Effects", *World Development*, Vol. 35, no. 3, pp. 377-393.

Alvarez, R. and R. A. López (2005), "Exporting and performance: evidence from Chilean plants", *Canadian Journal of Economics / Revue Canadienne d'Economique*, Vol. 38, no. 4, pp. 1384-1400.

Aw, B. Y. and A. R. Hwang (1995), "Productivity and the export market: A firm-level analysis", *Journal of Development Economics*, Vol. 47, no. 2, pp. 313-332.

Bernard, A. B. and J. B. Jensen (1995), "Exporters, Jobs, and Wages in the U.S. Manufacturing: 1976-1987", *Brookings Papers on Economic Activity*, pp. 67-119.

Bernard, A. B. and J. B. Jensen (1997), "Exporters, skill upgrading, and the wage gap", *Journal of International Economics*, Vol. 42, no. 1/2, pp. 3-31.

Bernard, A. B. and J. B. Jensen (1999), "Exceptional exporter performance: cause, effect, or both?", *Journal of International Economics*, Vol. 47, no. 1, pp. 1-25.

Bernard, A. B. and J. B. Jensen (2004a), "Exporting and Productivity in the USA", *Oxford Review of Economic Policy*, Vol. 20, no. 3, pp. 343-357.

Bernard, A. B. and J. B. Jensen (2004b), "Why Some Firms Export", *The Review of Economics and Statistics*, Vol. 86, no. 2, pp. 561-569.

Bernard, A. B. and J. Wagner (1997), "Exports and success in German manufacturing", *Weltwirtschaftliches Archiv / Review of World Economics*, Vol. 133, no. 1, pp. 134-157.

Bernard, A. B., J. B. Jensen and P. K. Schott (2006), "Trade costs, firms and productivity", *Journal of Monetary Economics*, Vol. 53, no. 5, pp. 917-937.

Bernard, A. B., J. Eaton, J. B. Jensen and S. Kortum (2003), "Plants and productivity in international trade", *The American Economic Review*, Vol. 93, no. 4, pp. 1268-1290.

Blalock, G. and P. J. Gertler (2004), "Learning from exporting revisited in a less developed setting", *Journal of Development Economics*, Vol. 75, no. 2, pp. 397-416.

Breusch, T. S. and A. R. Pagan (1979), "A Simple Test for Heteroscedasticity and Random Coefficient Variation", *Econometrica*, Vol. 47, no. 5, pp. 1287-1294.

Castellani, D. (2002), "Export Behavior and Productivity Growth: Evidence from Italian Manufacturing Firms", *Weltwirtschaftliches Archiv / Review of World Economics*, Vol. 138, no. 4, pp. 605-628.

Clerides, S. K., S. Lach and J. R. Tybout (1998), "Is Learning by Exporting Important? Micro-Dynamic Evidence from Colombia, Mexico, and Morocco", *The Quarterly Journal of Economics*, Vol. 113, no. 3, pp. 903-947.

Damijan, J. P. and C. Kostevc (2006), "Learning-by-Exporting: Continuous Productivity Improvements or Capacity Utilization Effects? Evidence from Slovenian Firms", *Review of World Economics*, Vol. 142, no. 3, pp. 599-614.

De Loecker, J. (2007), "Do exports generate higher productivity? Evidence from Slovenia", *Journal of International Economics*, Vol. 73, no. 1, pp. 69-98.

De Loecker, J. (2013), "Detecting Learning by Exporting", *American Economic Journal: Microeconomics*, Vol. 5, no. 3, pp. 1-21.

Delgado, M. A., J. C. Fariñas and S. Ruano (2002), "Firm productivity and export markets: a non-parametric approach", *Journal of International Economics*, Vol. 57, no. 2, pp. 397-422.

Egger, H. and U. Kreickemeier (2010), "Worker-specific Effects of Globalisation", *The World Economy*, Vol. 33, no. 8, pp. 987-1005.

European Commission (EC) (2003), "Commission Recommendation of 6 May 2003 concerning the definition of micro, small and medium-sized enterprises", notified under document number C(2003) 1422, 2003/361/EC, *Official Journal of the European Union*, L 124/36, http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2003:124:0036:0041:en:PDF, [visited in July 7th, 2014].

Eurostat (2011), "Key figures on European business with a special feature on SMEs", Eurostat Pocketbooks, http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-ET-11-001/EN/KS-ET-11-001-EN.PDF [visited in September 12th, 2014].

Fariñas, J. C. and A. Martín-Marcos (2007), "Exporting and Economic Performance: Firm-level Evidence of Spanish Manufacturing", *The World Economy*, Vol. 30, no. 4, pp. 618-646.

Fryges, H. and J. Wagner (2010), "Exports and Profitability: First Evidence for German Manufacturing Firms", *The World Economy*, Vol. 33, no. 3, pp. 399-423.

Fu, D. and Y. Wu (2013), "Export wage premium in China's manufacturing sector: A firm level analysis", *China Economic Review*, Vol. 26, pp. 182-196.

García, F., L. Avella and E. Fernández (2012), "Learning from exporting: The moderating effect of technological capabilities", *International Business Review*, Vol. 21, no. 6, pp. 1099-1111.

Girma, S., H. Görg and E. Strobl (2004), "Exports, international investment, and plant performance: evidence from a non-parametric test", *Economics Letters*, Vol. 83, no. 3, pp. 317-324.

Girma, S., R. Kneller and M. Pisu (2005), "Exports versus FDI: An empirical Test", *Review of World Economics*, Vol. 141, no. 2, pp. 193-218.

Golikova, V., K. Gonchar and B. Kuznetsov (2012), "Does international trade provide incentives for efficient behaviour of Russian manufacturing firms?", *Post-Communist Economies*, Vol. 24, no. 2, pp. 277-289.

Grazzi, M. (2012), "Export and Firm Performance: Evidence on Productivity and Profitability of Italian Companies", *Journal of Industry, Competition and Trade*, Vol. 12, no. 4, pp. 413-444.

Greenaway, D. and R. Kneller (2007), "Industry Differences in the Effect of Export Market Entry: Learning by exporting?", *Review of World Economics*, Vol. 143, no. 3, pp. 416-432.

Greenaway, D. and Z. Yu (2004), "Firm-Level Interactions between Exporting and Productivity: Industry-Specific Evidence", *Review of World Economics*, Vol. 140, no. 3, pp. 376-392.

Greenaway, D., J. Gullstrand and R. Kneller (2005), "Exporting May Not Always Boost Firm Productivity", *Review of World Economics*, Vol. 141, no. 4, pp. 561-582.

Haidar, J. I. (2012), "Trade and productivity: Self-selection or learning-by-exporting in India", *Economic Modelling*, Vol. 29, no. 5, pp. 1766-1773.

Helpman, E., M. J. Melitz and S. R. Yeaple (2004), "Export Versus FDI with Heterogeneous Firms", *The American Economic Review*, Vol. 94, no. 1, pp. 300-316.

Instituto Nacional de Estatística (INE) (2007), "Portugal - 20 Anos Integração Europeia / Portugal - 20 Years European Integration", https://infoeuropa.eurocid.pt/files/database/000038001-000039000/000038807.pdf [visited in September 24th, 2014].

Instituto Nacional de Estatística (INE) (2011), "O perfil exportador das PME em Portugal –2007/2009", http://www.ine.pt/xportal/xmain?xpid=INE&xpgid=ine_destaques&DESTAQUESdest_boui=107557341&DESTAQUESmodo=2 [visited in November 7th, 2013].

Instituto Nacional de Estatística (INE), I. P. (2014), Boletim Mensal de Estatística 2014, Edição Agosto 2014, Lisboa-Portugal: INE, I.P., http://www.ine.pt/xportal/xmain?xpid=INE&xpgid=ine_publicacoes&PUBLICACOESpub_boui=218579718&PUBLICACOESmodo=2 [visited in September 27th, 2014].

International Study Group on Exports and Productivity (ISGEP) (2008), "Understanding Cross-Country Differences in Exporter Premia: Comparable Evidence for 14 Countries", *Review of World Economics*, Vol. 144, no. 4, pp. 596-635.

Isgut, A. E. (2001), "What's different about exporters? Evidence from Colombian manufacturing", *The Journal of Development Studies*, Vol. 37, no. 5, pp. 57-82.

Kneller, R. and M. Pisu (2010), "The returns to exporting: evidence from UK firms", *Canadian Journal of Economics / Revue Canadienne d'Economique*, Vol. 43, no. 2, pp. 494-519.

Luong, T. A. (2013), "Does Learning by Exporting Happen? Evidence from the Automobile Industry in China", *Review of Development Economics*, Vol. 17, no. 3, pp. 461-473.

Máñez-Castillejo, J. A., M. E. Rochina-Barrachina and J. A. Sanchis-Llopis (2010), "Does Firm Size Affect Self-selection and Learning-by-Exporting?", *The World Economy*, Vol. 33, no. 3, pp. 315-346.

Melitz, M. J. (2003), "The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity", *Econometrica*, Vol. 71, no. 6, pp. 1695-1725.

Monreal-Pérez, J., A. Aragón-Sánchez and G. Sánchez-Marín (2012), "A longitudinal study of the relationship between export activity and innovation in the Spanish

firm: The moderating role of productivity", *International Business Review*, Vol. 21, no. 5, pp. 862-877.

Nassimbeni, G. (2001), "Technology, innovation capacity, and the export attitude of small manufacturing firms: a logit/tobit model", *Research Policy*, Vol. 30, no. 2, pp. 245-262.

Oliveira, M. M., L. D. Santos and N. Fortuna (2011), *Econometria*, Lisboa: Escolar Editora.

Organisation for Economic Co-operation and Development (OECD) (2001), "Measuring Productivity: Measurement of Aggregate and Industry-Level Productivity Growth", OECD Manual, http://www.oecd.org/std/productivity-stats/2352458.pdf [visited in December 15th, 2013].

Organisation for Economic Co-operation and Development (OECD) (2012),"OECD Economic Surveys – Netherlands", http://www.oecd.org/eco/50550641.pdf [visited in April 1st, 2014].

Organisation for Economic Co-operation and Development (OECD) (2005), "SBS Expert Meeting "Towards better Structural Business and SME Statistics"", OECD Statistics Directorate, Meeting document 6.1, http://www.oecd.org/industry/business-stats/35501496.pdf [visited in July 6th, 2014].

Park, H. M. (2011), "Practical Guides To Panel Data Modeling: A Step by Step Analysis Using Stata", Public Management and Policy Analysis Program, International University of Japan, http://www.iuj.ac.jp/faculty/kucc625/documents/panel_iuj.pdf [visited in July 24th, 2014]

Ruane, F. and J. Sutherland (2005), "Export Performance and Destination Characteristics of Irish Manufacturing Industry", *Review of World Economics*, Vol. 141, no. 3, pp. 442-459.

Schank, T., C. Schnabel and J. Wagner (2007), "Do exporters really pay higher wages? First evidence from German linked employer–employee data", *Journal of International Economics*, Vol. 72, no. 1, pp. 52-74.

Schröder, P. J. H. and A. Sørensen (2012), "Second thoughts on the exporter productivity premium", *Canadian Journal of Economics/ Revue Canadienne d'Economique*, Vol. 45, no. 4, pp. 1310-1331.

Silva, A., O. Afonso and A. P. Africano (2010a), "Do Portuguese manufacturing firms self select to exports?", *FEP Working Papers*, no. 371, April 2010.

Silva, A., O. Afonso and A. P. Africano (2010b), "Do Portuguese manufacturing firms learn by exporting?", *FEP Working Papers*, no. 373, April 2010.

Stöllinger, R., R. Stehrer and J. Pöschl (2012), "Austrian exporters: unique or alike? New insights and missing puzzle pieces", *Empirica*, Vol. 39, no. 3, pp. 375-405.

Tsou, M., J. Liu, J. K. Hammitt and K. Wang (2008), "Exporting and Productivity Growth: Evidence from the Taiwan Electronics Plants", *Scottish Journal of Political Economy*, Vol. 55, no. 2, pp. 190-209.

Van Biesebroeck, J. (2005), "Exporting raises productivity in sub-Saharan African manufacturing firms", *Journal of International Economics*, Vol. 67, no. 2, pp. 373-391.

Vogel, A. (2011), "Exporter performance in the German business services sector", *The Service Industries Journal*, Vol. 31, no. 7, pp. 1015-1031.

Vogel, A. and J. Wagner (2009), "Exports and Profitability: First Evidence for German Business Services Enterprises, *University of Lüneburg Working Paper Series in Economics*, no. 129.

Vu, H., M. Holmes, S. Lim and T. Tran (2014), "Exports and profitability: a note from quantile regression approach", *Applied Economics Letters*, Vol. 21, no. 6, pp. 442-445.

Wagner, J. (1995), "Exports, Firm Size, and Firm Dynamics", *Small Business Economics*, Vol. 7, no. 1, pp. 29-39.

Wagner, J. (2002), "The causal effects of exports on firm size and labor productivity: first evidence from a matching approach", *Economics Letters*, Vol. 77, no. 2, pp. 287-292.

Wagner, J. (2007), "Exports and Productivity: A Survey of the Evidence from Firm-level Data", *World Economy*, Vol. 30, no. 1, pp. 60-82.

Wagner, J. (2012), "International trade and firm performance: a survey of empirical studies since 2006", *Review of World Economics*, Vol. 148, no. 2, pp. 235-267.

Were, M. and S. Kayizzi-Mugerwa (2009), "Do Exporting Firms Pay Higher Wages? Evidence from Kenya's Manufacturing Sector", *African Development Review-Revue Africaine De Developpement*, Vol. 21, no. 3, pp. 435-453.

White, H. (1980), "A Heteroskedasticity-Consistent Covariance Matrix Estimator and a Direct Test for Heteroskedasticity", *Econometrica*, Vol. 48, no. 4, pp. 817-838.

Wilhelmsson, F. and K. Kozlov (2007), "Exports and productivity of Russian firms: in search of causality", *Economic Change and Restructuring*, Vol. 40, no. 4, pp. 361-385.

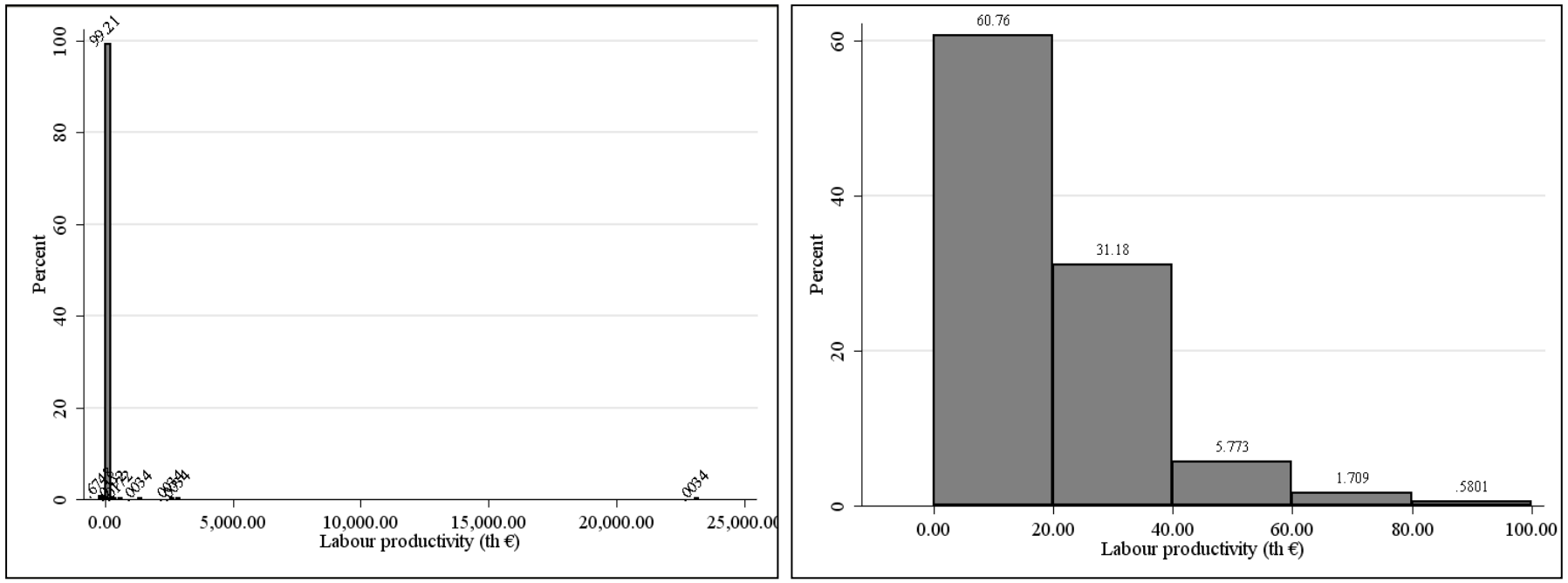
World Trade Organization (WTO), http://www.wto.org/english/thewto_e/glossary_e/glossary_e.htm [visited in December 15th, 2013].

Yang, Y. and S. Mallick (2010), "Export Premium, Self-selection and Learning-by-Exporting: Evidence from Chinese Matched Firms", *The World Economy*, Vol. 33, no. 10, pp. 1218-1240.

Yasar, M. and R. M. Rejesus (2005), "Exporting status and firm performance: Evidence from a matched sample", *Economics Letters*, Vol. 88, no. 3, pp. 397-402.

Appendix

Figure A – Histogram of the distribution of labour productivity (sample only with firms with age equal to or under 28) before (left) and after (right) imposing the criterion: labour productivity ranging from 0 to 100, inclusive.



Source: Own elaboration based on Stata 12.0.

Figure B – Treating process of the data in the sample: phases and number of firms in each step

Source: Own elaboration based on Stata 12.0..

Table A1 – Number of observations (and percentage) of each subsector of sector C of Primary NACE Rev. 2 code

		TOTAL		EXPORTERS		NON-EXPORTERS	
Subsector	Manufacturing	Observations	%	Observations	%	Observations	%
10	Manufacture of food products	4,019	14.05	1,000	6.89	3,019	21.41
11	Manufacture of beverages	272	0.95	234	1.61	38	0.27
12	Manufacture of tobacco products	0	0.00	0	0.00	0	0.00
13	Manufacture of textiles	1,724	6.03	805	5.55	919	6.52
14	Manufacture of wearing apparel	4,882	17.06	2,101	14.48	2,781	19.72
15	Manufacture of leather and related products	2,451	8.57	1,245	8.58	1,206	8.55
16	Manufacture of wood and products of wood and cork except furniture; manufacture of articles of straw and plaiting materials	1,268	4.43	690	4.75	578	4.10
17	Manufacture of paper and paper products	311	1.09	223	1.54	88	0.62
18	Printing of reproduction of recorded media	839	2.93	398	2.74	441	3.13
19	Manufacture of coke and refined petroleum products	0	0.00	0	0.00	0	0.00
20	Manufacture of chemicals and chemical products	420	1.47	306	2.11	114	0.81
21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	103	0.36	68	0.47	35	0.25
22	Manufacture of rubber and plastic products	995	3.48	740	5.10	255	1.81
23	Manufacture of other non-metallic mineral products	1,804	6.30	1,123	7.74	681	4.83
24	Manufacture of basic metals	255	0.89	204	1.41	51	0.36
25	Manufacture of fabricated metal products, except machinery and equipment	4,220	14.75	2,162	14.90	2,058	14.59
26	Manufacture of computer, electronic and optical products	162	0.57	132	0.91	30	0.21
27	Manufacture of electrical equipment	419	1.46	297	2.05	122	0.87
28	Manufacture of machinery and equipment n.e.c.	1,039	3.63	758	5.22	281	1.99
29	Manufacture of motor vehicles, trailers and semi-trailers	449	1.57	345	2.38	104	0.74
30	Manufacture of other transport equipment	119	0.42	86	0.59	33	0.23
31	Manufacture of furniture	1,677	5.86	925	6.37	752	5.33
32	Other manufacturing	481	1.68	353	2.43	128	0.91
33	Repair and installation of machinery and equipment	705	2.46	318	2.19	387	2.74
		28,614	100%	14,513	100%	14,101	100%

Source: Own elaboration based on Stata 12.0 based on Stata 12.0.

Table A2 – Correlation Matrix

	exporter	labprod	profmg	wages_emp	employ	employ_sq	age	age_sq	expsize	sector_10	sector_11
exporter	**1.0000**										
labprod	0.2948*	**1.0000**									
profmg	0.0448*	0.3033*	**1.0000**								
wages_emp	0.2501*	0.7514*	0.0889*	**1.0000**							
employ	0.1813*	0.1757*	0.0160*	0.1413*	**1.0000**						
employ_sq	0.0435*	0.0902*	0.0041	0.0631*	0.8008*	**1.0000**					
age	0.1908*	0.0893*	-0.0113	0.1258*	0.0696*	0.0171*	**1.0000**				
age_sq	0.1853*	0.0752*	-0.0134	0.1144*	0.0677*	0.0133	0.9745*	**1.0000**			
expsize	0.3205*	0.2050*	0.0215*	0.1572*	0.9452*	0.7778*	0.0930*	0.0899*	**1.0000**		
sector_10	-0.2089*	-0.0711*	-0.0150	-0.1167*	-0.0098	-0.0025	0.0081	0.0048	-0.0421*	**1.0000**	
sector_11	0.0692*	0.1191*	-0.0455*	0.0450*	0.0326*	0.0153*	0.0089	0.0070	0.0373*	-0.0396*	**1.0000**
sector_13	-0.0204*	-0.0465*	-0.0292*	-0.0674*	0.0158*	0.0027	0.0019	0.0038	0.0132	-0.1024*	-0.0248*
sector_14	-0.0697*	-0.3057*	-0.0754*	-0.3004*	-0.0168*	-0.0164*	-0.0621*	-0.0532*	-0.0272*	-0.1833*	-0.0444*
sector_15	0.0005	-0.1508*	0.0449*	-0.1693*	0.0039	-0.0063	-0.1042*	-0.0885*	0.0090	-0.1237*	-0.0300*
sector_16	0.0159*	0.0211*	0.0015	-0.0017	-0.0306*	-0.0101	0.0433*	0.0390*	-0.0219*	-0.0870*	-0.0211*
sector_17	0.0440*	0.0479*	0.0064	0.0328*	-0.0006	-0.0033	0.0006	-0.0001	0.0064	-0.0424*	-0.0103
sector_18	-0.0114	0.0903*	-0.0026	0.0864*	-0.0270*	-0.0082	0.0458*	0.0432*	-0.0252*	-0.0703*	-0.0170*
sector_20	0.0540*	0.1392*	0.0097	0.1320*	-0.0055	-0.0042	0.0296*	0.0264*	0.0033	-0.0493*	-0.0120
sector_21	0.0184*	0.1077*	0.0151	0.1568*	0.0361*	0.0022	-0.0105	-0.0056	0.0360*	-0.0243*	-0.0059
sector_22	0.0898*	0.1168*	0.0256*	0.0827*	0.0074	-0.0044	0.0295*	0.0218*	0.0239*	-0.0767*	-0.0186*
sector_23	0.0598*	0.0440*	-0.0283*	0.0360*	-0.0175*	-0.0093	0.0493*	0.0410*	-0.0087	-0.1049*	-0.0254*
sector_24	0.0555*	0.0713*	0.0057	0.0491*	0.0290*	0.0012	0.0139	0.0124	0.0336*	-0.0383*	-0.0093
sector_25	0.0043	0.1365*	0.0540*	0.2028*	-0.0385*	-0.0146	0.0018	0.0018	-0.0341*	-0.1681*	-0.0407*

sector_26	0.0464*	0.0878*	0.0255*	0.0943*	0.0740*	0.0390*	0.0002	-0.0010	0.0804*	-0.0305*	-0.0074
sector_27	0.0492*	0.0769*	0.0255*	0.0944*	0.0398*	0.0108	0.0143	0.0126	0.0406*	-0.0493*	-0.0119
sector_28	0.0863*	0.1312*	0.0379*	0.1510*	-0.0118	-0.0070	0.0638*	0.0585*	0.0017	-0.0785*	-0.0190*
sector_29	0.0660*	0.0810*	0.0049	0.0804*	0.1926*	0.1464*	-0.0037	-0.0060	0.2028*	-0.0510*	-0.0124
sector_30	0.0279*	0.0091	-0.0126	0.0363*	0.0072	-0.0019	-0.0036	-0.0047	0.0069	-0.0261*	-0.0063
sector_31	0.0221*	-0.0966*	-0.0295*	-0.1119*	-0.0309*	-0.0103	-0.0125	-0.0126	-0.0198*	-0.1009*	-0.0244*
sector_32	0.0593*	0.0005	0.0101	0.0160*	-0.0135	-0.0053	0.0098	0.0102	-0.0043	-0.0529*	-0.0128
sector_33	-0.0178*	0.1167*	0.0390*	0.2226*	0.0091	0.0072	-0.0121	-0.0136	-0.0251*	-0.0642*	-0.0156*

Source: Own elaboration based on Stata 12.
Notes: * means that the correlation is statistical significant at 1% level.

Table A2 – Correlation Matrix (cont.)

	sector_13	**sector_14**	**sector_15**	**sector_16**	**sector_17**	**sector_18**	**sector_20**	**sector_24**	**sector_22**	**sector_23**
sector_13	**1.0000**									
sector_14	-0.1148*	**1.0000**								
sector_15	-0.0775*	-0.1388*	**1.0000**							
sector_16	-0.0545*	-0.0977*	-0.0659*	**1.0000**						
sector_17	-0.0265*	-0.0475*	-0.0321*	-0.0226*	**1.0000**					
sector_18	-0.0440*	-0.0788*	-0.0532*	-0.0374*	-0.0182*	**1.0000**				
sector_20	-0.0309*	-0.0554*	-0.0374*	-0.0263*	-0.0128	-0.0212*	**1.0000**			
sector_21	-0.0152	-0.0273*	-0.0184*	-0.0129	-0.0063	-0.0104	-0.0073	**1.0000**		
sector_22	-0.0481*	-0.0861*	-0.0581*	-0.0409*	-0.0199*	-0.0330*	-0.0232*	-0.0114	**1.0000**	
sector_23	-0.0657*	-0.1177*	-0.0794*	-0.0559*	-0.0272*	-0.0451*	-0.0317*	-0.0156*	-0.0492*	**1.0000**
sector_24	-0.0240*	-0.0430*	-0.0290*	-0.0204*	-0.0099	-0.0165*	-0.0116	-0.0057	-0.0180*	-0.0246*
sector_25	-0.1053*	-0.1886*	-0.1273*	-0.0896*	-0.0436*	-0.0723*	-0.0508*	-0.0250*	-0.0789*	-0.1079*
sector_26	-0.0191*	-0.0342*	-0.0231*	-0.0162*	-0.0079	-0.0131	-0.0092	-0.0045	-0.0143	-0.0196*

sector_27	-0.0309*	-0.0553*	-0.0373*	-0.0263*	-0.0128	-0.0212*	-0.0149	-0.0073	-0.0231*	-0.0316*
sector_28	-0.0491*	-0.0880*	-0.0594*	-0.0418*	-0.0203*	-0.0337*	-0.0237*	-0.0117	-0.0368*	-0.0504*
sector_29	-0.0320*	-0.0573*	-0.0386*	-0.0272*	-0.0132	-0.0219*	-0.0154*	-0.0076	-0.0240*	-0.0328*
sector_30	-0.0164*	-0.0293*	-0.0198*	-0.0139	-0.0068	-0.0112	-0.0079	-0.0039	-0.0123	-0.0168*
sector_31	-0.0632*	-0.1132*	-0.0764*	-0.0537*	-0.0262*	-0.0434*	-0.0305*	-0.0150	-0.0474*	-0.0647*
sector_32	-0.0331*	-0.0593*	-0.0400*	-0.0282*	-0.0137	-0.0227*	-0.0160*	-0.0079	-0.0248*	-0.0339*
sector_33	-0.0402*	-0.0721*	-0.0486*	-0.0342*	-0.0167*	-0.0276*	-0.0194*	-0.0096	-0.0302*	-0.0412*

Source: Own elaboration based on Stata 12.
Notes: * means that the correlation is statistical significant at 1% level.

Table A2 – Correlation Matrix (cont.)

	sector_24	**sector_25**	**sector_26**	**sector_27**	**sector_28**	**sector_29**	**sector_30**	**sector_32**	**sector_32**	**sector_33**
sector_24	**1.0000**									
sector_25	-0.0394*	**1.0000**								
sector_26	-0.0072	-0.0314*	**1.0000**							
sector_27	-0.0116	-0.0507*	-0.0092	**1.0000**						
sector_28	-0.0184*	-0.0807*	-0.0146	-0.0237*	**1.0000**					
sector_29	-0.0120	-0.0525*	-0.0095	-0.0154*	-0.0245*	**1.0000**				
sector_30	-0.0061	-0.0269*	-0.0049	-0.0079	-0.0125	-0.0082	**1.0000**			
sector_31	-0.0237*	-0.1038*	-0.0188*	-0.0304*	-0.0484*	-0.0315*	-0.0161*	**1.0000**		
sector_32	-0.0124	-0.0544*	-0.0099	-0.0159*	-0.0254*	-0.0165*	-0.0084	-0.0326*	**1.0000**	
sector_33	-0.0151	-0.0661*	-0.0120	-0.0194*	-0.0309*	-0.0201*	-0.0103	-0.0397*	-0.0208*	**1.000**

Source: Own elaboration based on Stata 12.
Notes: * means that the correlation is statistical significant at 1% level.